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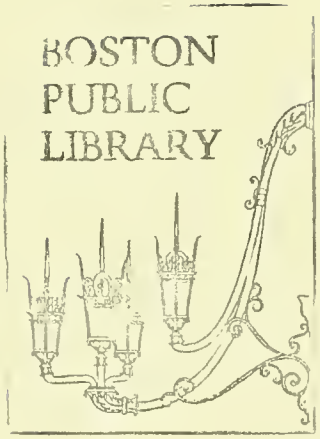
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MASSACHUSETTS OUTDOOR RECREATION PLAN

FRANCIS W. SARGENT, GOVERNOR

EXECUTIVE OFFICE OF
ENVIRONMENTAL AFFAIRS

CHARLES H.W. FOSTER, SECRETARY

PREPARED BY
THE
MASSACHUSETTS
DEPARTMENT
OF
NATURAL
RESOURCES

[illegible]UR W. BROWNELL, COMMISSIONER

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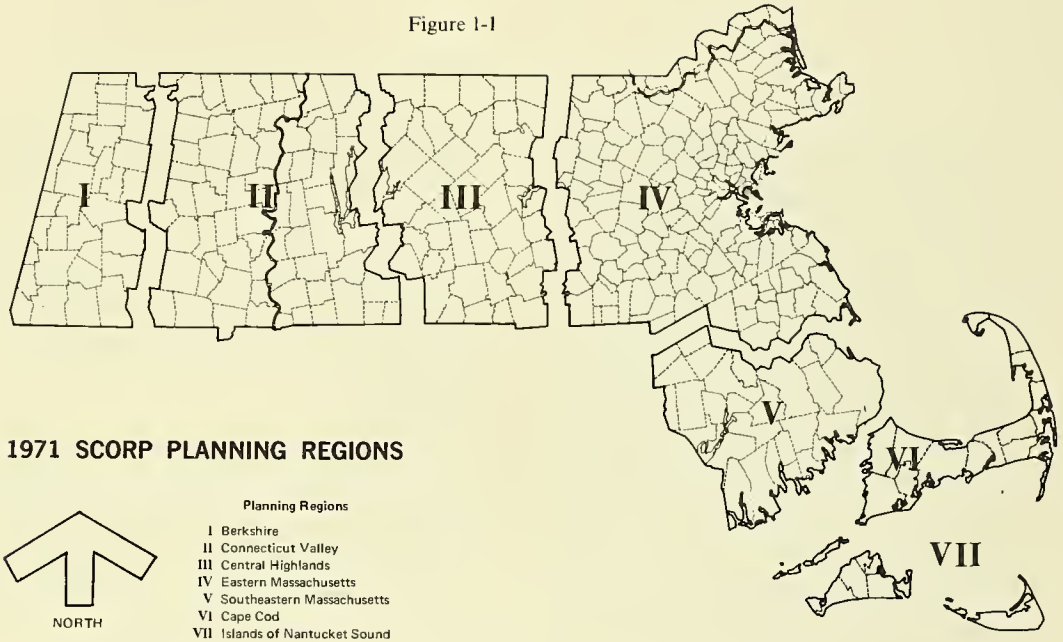
INTRODUCTION

Since the Massachusetts Outdoor Recreation Plan in 1966, many changes have taken place in the Commonwealth and across the nation. One of the most vital changes has been the realization that our natural resources are finite; that we have only one earth on which to live. No longer can we continue to pollute the water, defile the landscape and mindlessly consume our natural resources in the name of progress. The endless accumulation of these sins against the environment will ultimately jeopardize our survival on this planet.

The need for finding compatible relationships with our environment and new means for revitalizing the human experience has become urgent. Open spaces, reservations and park systems, particularly in the urban areas, are essential to the quality of the human experience. Unfortunately, urban growth, shifting social priorities and public apathy have led to the erosion of open space. For many years priorities and the programs of both the federal government and the state of Massachusetts have not kept pace with the outdoor recreation and open space needs of urban areas. The 1966 Massachusetts Outdoor Recreation Plan recognized the inequities in the distribution of open space land throughout the Commonwealth and although progress has been made in Massachusetts to meet the needs recognized in the 1966 Plan, the 1971 Plan repeats the urgency of redressing the lack of open spaces and recreational development in urban areas.

In Massachusetts there are stirrings of change. The Commonwealth has begun a program of conservation and land use management, but these programs are only the beginning steps in identifying, protecting and rehabilitating irreplaceable natural and historical resources. The problems of open space cannot be solved piecemeal or in a vacuum, but only on the basis of comprehensive planning - planning for agriculture, industry, transportation, housing, water supply, and waste disposal, as well as recreation.

Figure 1-1



In addition, a comprehensive plan cannot be carried out merely within the state framework. It is proposed, therefore, that in its continued planning efforts, Massachusetts begin a major program to coordinate land use planning not only among the various planning agencies in the Commonwealth, but also in concert with corresponding agencies in other New England states and the federal government. In these coordination efforts, the computer holds great promise. The 1971 State Plan has begun to explore the use of the computer in recreation planning and to realize its tremendous potential. The Plan is an exploratory step in the recreational aspect of land use planning and hopefully one which will lead to a truly comprehensive land use policy for the Commonwealth.

Legal Authority

The authority of the Department of Natural Resources to participate in the Federal Land and Water Conservation Fund Act is set out in Section One of c. 507 of the Acts of 1964, as amended by c. 646 of the Acts of 1965. Those provisions are as follows.

> The department of natural resources is hereby authorized and directed to expend a sum not exceeding three million three hundred thousand dollars for the development or redevelopment and improvement of outdoor recreation areas, including the acquisition of land therefor, as authorized by section three of chapter one hundred and thirty-two A of the General Laws. Funds authorized to be expended by this act shall be subject to the provisions of law regulating the disburse-

ment of public funds and the approval thereof; provided, however, that such expenditures shall be not subject to the provisions of section thirty A of chapter seven of the General Laws; and, providing further, that funds made available by this act shall be available for the purpose of providing the commonwealth's share of the cost of the program authorized under the Land and Water Conservation Fund Act of 1965 (P.L. 88-578), and the department of natural resources is hereby authorized on behalf of the commonwealth or any political subdivision thereof to apply to and contract with the United States of America and agencies thereof to obtain grants, subventions and reimbursements under said Land and Water Conservation Fund Act, and shall disburse such federal funds in accordance with the terms and conditions of such contracts.

It is clear from the above quoted statutory provisions, that the Department of Natural Resources has full and complete authority to apply to and contract with the federal government and/or its agencies for participation in the funds made available by the Land and Water Conservation Fund Act. This general authority is, in the absence of express statutory language, without limitations. The provisions of the Land and Water Conservation Fund Act of 1965 specify that "a comprehensive statewide outdoor recreation plan shall be required prior to the consideration by the Secretary of Financial Assistance for acquisition or development projects."

Goals

The present Plan has set goals for Massachusetts in 1971 which differ little from those stated in the 1966 Plan. The state recognized then that "meaningful recreational experiences should be available for all the people of the Commonwealth." Furthermore, the Commonwealth believes that all levels of government and the private sector should take prompt and coordinated action to the extent practicable to conserve, develop, and utilize recreational resources for the benefit and enjoyment of the public.

The primary goals of the 1971 Outdoor Recreation Plan are to determine the present and projected outdoor recreation needs of the residents of Massachusetts and their guests and to develop guidelines and a framework within which these needs can be satisfied.

Methodology

The 1971 Outdoor Recreation Plan was designed to update and expand the data gathered for the 1966 Plan. As part of the 1971 Plan, new studies on supply and demand in the Commonwealth were undertaken with a view to either expanding earlier studies or gathering information where none had previously existed. In all, three major projects - the Boston Area Study, the State Park and Forest User Survey and the 1970 Inventory of Outdoor Recreation and Open Space - were designed and implemented. Through an inter-agency arrangement computer capabilities were secured to tabulate the inventory. Each of these projects is described in the Studies and Methods Chapter.

Planning Regions

For the 1971 Plan Massachusetts was divided into seven planning regions, each having a distinct geographic and socioeconomic identity. The seven regions are listed in the following table and are shown on figure 1-1.

Table 1-1

State Comprehensive Outdoor Recreation Plan Regions, 1970

Planning Region	Area in Square Miles	Number of Municipalities	1970 Population
I. Berkshire	950	32	149,400
II. Connecticut Valley	1,910	69	642,200
III. Central Highlands	1,360	46	522,000
IV. Eastern Massachusetts	2,300	152	3,769,400
V. Southeastern Massachusetts	900	29	499,600
VI. Cape Cod	400	15	96,700
VII. Islands of Nantucket Sound	160	8	9,900
State Total	7,980	351	5,689,200

The planning regions are based on the 1966 Outdoor Recreation Plan regions and the U.S. Department of Housing and Urban Development's planning regions. Each region is identical or similar to a combination of HUD regional planning and economic development regions, except for Eastern Massachusetts. This region was established during the late 1950's as a unit for a number of federally-aided studies of land use, traffic flow, parking, water supply and distribution, sewerage, tourism and vacation travel and open space. With such a wealth of prior studies and tabulated data to follow as a model, the Eastern Massachusetts Region was chosen for the 1971 Outdoor Recreation Plan. This Region also embraces all of the many districts in the metropolitan area delineated in 1969 by the Massachusetts Department of Administration and Finance.

After having chosen the boundaries of the Eastern Massachusetts Region, it was found that 21 municipalities included in the 1966 Central Highlands Region would not be in the 1971 Central Highlands Planning Region, but would be in the Eastern Massachusetts Region. Except for those 21 municipalities, the southern, eastern and northern boundaries of the 1971 Eastern Massachusetts Region are identical to the 1966 Outdoor Recreation Plan study regions.

Report Format

The organization of the report into individually numbered sections and in a "loose-leaf" format will permit the easy insertion of any new or revised information which will be supplied as it becomes available over the ensuing months.

SUMMARY

Recreation is an integral part of the well-being of our society. Yet in our most densely populated areas there exists an acute shortage of recreational opportunities. The 1971 State Comprehensive Outdoor Recreation Plan (SCORP) attempts to measure in detail the general needs for swimming, picnicking, camping and boating. It also addresses the problem of providing recreational opportunities to areas of greatest needs, specifically the urban areas.

Supply

The 1970 Inventory identified approximately 9,000 recreation and open-space sites totaling 742,790 acres. The state, which owns 51% of these lands, is the largest single landholder; most of the state-owned lands are located in the western part of the state, and especially in the less densely populated areas. The private sector owns 22% of the existing outdoor recreation and open space acres in Massachusetts, while the municipal sector owns 17% and the federal government owns 10%.

In addition, Massachusetts has abundant water resources. Approximately 2,000 miles of Atlantic coastline, 5,600 miles of rivers and streams and 1,325 water bodies totaling 140,738 acres provide innumerable opportunities for water-based recreation. Polluted waters and the lack of public access tend to limit the use of many water areas. This is extremely critical because pollution problems are generally concentrated in urban areas where recreational need is greatest.

The analysis of supply was limited to four activities - swimming, picnicking, camping and boating. In 1970 approximately two-thirds of Massachusetts' total supply of facilities for swimming was located in the two planning regions of Eastern Massachusetts and Cape Cod. The Eastern Massachusetts Region also accounted for nearly one-half of the Commonwealth's supply of picnicking and boating facilities. More than ninety (90) percent of the state's total supply of camping facilities is located in the planning regions of Berkshire, Connecticut Valley, Central Highlands, Eastern Massachusetts and Cape Cod; the Berkshire Region alone accounts for 38% of the statewide supply.

Demand

Demand for swimming, boating, camping and picnicking was estimated for 1970, 1985 and 2000. A comparison of the 1970 distribution of demand for the four activities by planning region showed that the Eastern Massachusetts Region, which contains two-thirds of the population of the state, represented approximately 55% of the total state demand for these activities. In each of the seven planning regions, estimated demand for 1985 and 2000 is substantially higher for all four activities than the 1970 demand. The Cape Cod, Berkshire and Islands Planning Regions show the greatest percentage increase in demand for those years, reflecting present and projected use of these regions by large numbers of out-of-state visitors.

Needs

Throughout the state, the need for recreation lands and facilities is high. Areas classified as *open* (communities with low population densities) had the greatest number of existing recreation acres per 1,000 population, while population areas of greater densities had the poorest ratio of recreation acres to population. In addition, areas with lower population densities have a large share of each planning region's existing recreation acres while areas of high density have a small share of each planning region's total existing recreation acres.

The distribution of lands and people is inversely related; approximately one half of the state's population lives in areas classified as *extremely dense* and *very dense* while 91% of the total existing recreation acres in Massachusetts are located in areas classified as *dense, less dense* and *open*.

In most of the planning regions, the *open* areas had a small share of the population and a large share of the region's total existing recreation acres. However, even though a population area in a planning region may seem to have sufficient total acreage, it may still be lacking lands suitable for certain outdoor recreation facilities and activities, a deficiency perhaps not apparent in the regional statistics. Furthermore, in some population areas new acquisition and development may be required to keep pace with population expansion and new residential development not existing in 1970.

For the most part, all population density areas of all planning regions have a need for facilities for swimming, picnicking, camping and boating. In all regions, swimming facilities are more urgently needed than those for the other three activities. For each of the four activities, the Eastern Massachusetts Planning Region had the largest deficit. At present there appears to be a surplus of swimming potential on Cape Cod and the Islands and a slight surplus of camping in the Berkshires; however, these will disappear in a relatively short time. Also, these surpluses help to compensate for deficits shown in other nearby areas.

In 1970, needs for facilities for the four activities are generally highest in the higher population density areas of the state. This pattern is expected to continue in 1985 and 2000. In addition, it is expected that statewide needs for swimming, picnicking, camping and boating will nearly double by 2000.

Presently, the private and municipal sectors are playing the major role in providing swimming and picnicking facilities. Boating and camping facilities

are being supplied primarily by the private sector. It is recommended that these roles be continued. In addition, public agencies and the private non-profit sector should continue to provide facilities on their lands where appropriate, with particular emphasis on facilities which cannot be provided by the private commercial sector at a profit.

Needs for other outdoor recreation activities exist and are recognized. At the present time, however, data concerning these activities are not available for a detailed analysis.

Programs

Based on available information, an estimated $132 million will be spent on acquisition and development by federal and state agencies throughout the Commonwealth between 1972-1976. Of this total, $82.8 million, or about 61% of the total, will be spent in the Eastern Massachusetts Planning Region. On a statewide basis, about two-thirds will be used for development and one-third for acquisition. Federal agencies involved in the programs are the National Park Service and the Bureau of Sport Fisheries and Wildlife in the Department of the Interior, the Corps of Engineers in the Department of Defense, and the Soil Conservation Service in the Department of Agriculture through the P.L. 566 Program. State agencies involved are the Metropolitan District Commission and the Divisions of Forest and Parks, Fisheries and Game, Water Resources and the Public Access Board in the Department of Natural Resources.

In addition, during the five year period, the municipal sector is estimated to spend a minimum of $52.7 million, based on information available concerning previous annual expenditures. It should be recognized that the figures are not complete and understate the municipal programs. Approximately 80% of the estimated municipal expenditures during 1972-1976 will be spent in the Eastern Massachusetts Region based on past experience, it is further estimated that about two-thirds will be spent on development and one-third on acquisition.

Sources of funding for acquisition and development of outdoor recreation and open space projects are varied. The major federal grants-in-aid programs available to assist state and local governments in Massachusetts are the Land and Water Conservation Fund, the Recreation Support Program, the Pittman-Robertson and Dingle-Johnson Funds and Housing and Urban Development Open Space funds. The major state grants-in-aid program is Self Help, which is available to conservation commissions. Total grants-in-aids fund approximately $11,500,000 annually.

Recommendations

In order to meet the present and future outdoor recreation and open space needs of its citizens in the most effective way, the Commonwealth has formulated a set of policies, priorities and recommendations for future action.

POLICIES

It should be the policy of all levels of government to:

1. Assure that high priority be given to outdoor recreation and open space.
2. Provide for the outdoor recreation and open space needs of its citizens, including the handicapped, elderly, disadvantaged and urban residents.
3. Protect unique natural and cultural features.
4. Insure public access to all resources providing outdoor recreation opportunities.
5. Promote effective communication and coordination among all levels of government including citizen participation.
6. Establish or promote conservation programs and environmental education.
7. Conduct research into areas of special needs and require that master plans be prepared for all outdoor recreation areas.
8. Establish an information program to publicize available outdoor recreation resources in Massachusetts.

PRIORITIES

The role of planning should be considered the major priority in all outdoor recreation programs in Massachusetts. However, acquisition and development projects should be continued in accord with previously prepared outdoor recreation plans. Certain types of acquisition and development projects have higher priority than other types. Top priority should be given to acquisition projects which serve residents of urban areas, protect and provide access to water resources, protect unique natural and cultural elements of national and state significance and projects which assist the implementation of existing programs. Next in priority are development projects which serve residents in urban areas, those which renovate or rehabilitate threatened resources and those which serve non-urban development in areas of heavy recreational demand.

Important but on a second level of priority are acquisition projects which reserve wild areas and those which protect unique natural and cultural elements of regional or local significance. Also needed but lowest in priority are development of visitor information centers and development in less intensively used recreation areas.

There are occasions when highly desirable parcels become available unexpectedly. These occasions are infrequent and represent unanticipated acquisition opportunities that should not be lost. These should be acquired despite other project priorities.

Furthermore, top priority should be given to those projects which are in accord with existing outdoor recreation plans and/or are located in recreation areas for which a master plan for outdoor recreation and open space has been prepared.

RECOMMENDATIONS

The *federal government* should continue to provide programs of technical and financial assistance and to manage and protect natural, cultural and historic resources of national significance. In addition, the federal government should:

1. Accelerate its land acquisition program for the Cape Cod National Seashore and Minuteman National Historic Site.
2. Expand the Land and Water Conservation Fund to include recreation buildings and indoor facilities as eligible projects.
3. Continue to investigate the recreation and open-space potential of all federal properties.

The *state government* should continue to plan, acquire, develop, operate and maintain lands and facilities for public recreational use and to protect and enhance the natural resources of the state. In addition, the state government should:

1. Make a greater effort to clean up the state's natural lakes, streams and harbors, particularly in urban areas.
2. Place greater emphasis on providing public access to land and water recreational resources, especially in the urban areas.
3. Give major emphasis to acquiring and preserving the remaining lands along the coast and important river systems.
4. Acquire vacated transportation rights-of-way for recreational use.
5. Investigate state surplus lands for recreational or open space potential.
6. Give continued attention to providing specially designed facilities at state lands for the handicapped, elderly, or disabled.
7. Formally establish comprehensive planning coordination with other state, regional and federal agencies.
8. Adopt the concept of establishing a Land Bank for the purpose of acquiring or designating lands as areas to be held for recreation and open space.
9. Commit itself to an innovative concept of recycling and re-using existing water supplies instead of developing water resources in areas distant from the major populations and also to make multiple use of existing water supplies.
10. Commit itself to developing a land-use policy and plan for the Commonwealth.
11. Commit itself to increased financial and technical assistance to regional and local agencies for planning, acquisition, development, programming and management of recreation areas and facilities.
12. Protect unique landscape and resource elements by acquisition, restriction or limitation of use and act as a coordinator for the efforts of other agencies and private organizations.

The *municipal governments* should continue to provide land, facilities and programs to meet the outdoor recreation and open space needs of its citizens, particularly at a neighborhood and sub-neighborhood level. In addition, municipal governments should:

1. Clean up the natural water systems.
2. Provide access to public recreational resources.
3. Locate community-wide centers near public transportation lines.
4. Recognize diverse ethnic and cultural heritages in neighborhoods when planning programs and designing facilities.
5. Utilize public facilities to their optimum by making them available when they are not being used for their primary purpose.
6. Encourage citizen participation in planning, construction and maintenance of outdoor recreation areas.
7. Reserve unique lands in their natural state whenever possible.
8. Protect valuable local resources, including Town Commons.
9. Explore alternative means such as zoning, easements and tax incentives for protecting recreation and open space land.
10. Develop comprehensive trail systems which will tie in with existing systems.

The *private "profit" sector* should continue to provide quality recreation at a reasonable cost and particularly to provide services and specialized activities meeting individual preferences. The *private "non-profit" sector* should continue to provide quality recreation and open space at the local and regional level and continue to complement government and private profit roles, particularly in areas of environmental education, conservation and preservation.

SPECIAL OPPORTUNITIES

Several special opportunities to identify and meet recreation and open space needs in the Commonwealth exist. These opportunities include federal, state, regional and private studies analyzing various aspects of recreation and open space, investigation and use of untapped or underutilized resources, and the Bicentennial Celebration of 1975-1976. It is recommended that all levels of government examine these special opportunities and utilize them when appropriate to help meet present and future outdoor recreation and open space needs.

Continuing Planning

Since any plan is a projection into the future it is subject to change occurring over time. If a comprehensive outdoor recreation plan is to be truly effective, it should be continually updated to reflect the changes that occur in the quality and the kind of outdoor recreation lands and facilities needed. The continuing planning program in Massachusetts will give emphasis to:

1. Updating and refining the 1971 Plan.
2. Establishing computer capability for land use

planning procedures.
3. Establishing formal communication with federal, state and regional agencies involved in recreation.
4. Developing a system so that the Commonwealth will be a participant in current studies which influence recreation.
5. Initiating new studies to examine the outdoor recreation needs of special groups and problems.

THE STATE SETTING

Massachusetts, one of the six New England states, is bordered on the south by Rhode Island and Connecticut, on the west by New York, on the north by New Hampshire and Vermont, and on the east and south by the Atlantic Ocean. There are 351 cities and towns in the Commonwealth and 14 counties, totaling 7,980 square miles. Although Massachusetts is a small state - 100 miles wide and less than 200 miles long from Cape Cod to the New York border - it encompasses a wide variety of climates, landforms, vegetation and people.

Physical Setting

This section presents the physical setting for recreation in Massachusetts under the headings of topography, climate, water resources, soils and vegetation.

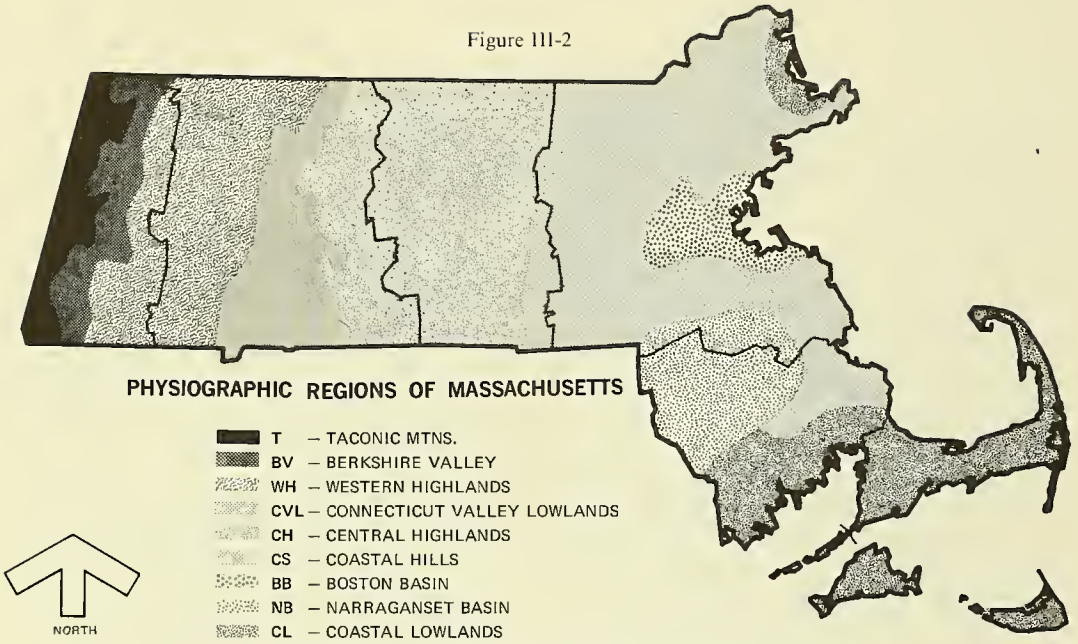
TOPOGRAPHY

Effects of Continental Glaciation

Ten to fifteen thousand years ago much of the northern United States was covered by a continental ice sheet. As the glacier advanced and retreated, it scraped away at existing landforms in some areas and deposited earth materials in others. The structural geology of the United States north of the Ohio and Missouri rivers has consequently been greatly masked by glacial deposition and erosion.

Figure III-1

Figure III-2



SOURCE: EMERSON, B.K. *GEOLOGY OF MASSACHUSETTS AND RHODE ISLAND*

Throughout Massachusetts there are numerous examples of landforms shaped by moving ice. Some of the existing glacial landforms deposited by the ice are drumlins and terminal and recessional moraines. Massachusetts is notably stony and much of it is littered with glacial boulders. The spines of Cape Cod and the islands of Nantucket Sound are made up of terminal moraine deposits; the Boston Basin contains one of the world's most famous drumlin fields.

Numerous landscape features were also formed as water-borne sediments interlayered with melting ice. Outwash plains, formed by streams originating from melting glacial ice, are pitted by kettle holes. Many of these holes, now filled with water, form small circular ponds; Cape Cod is dotted with many of these.

As the glacier retreated, drainage patterns were disrupted. Rivers were temporarily dammed and lakes fed by melt waters were formed. Largest and most famous was Lake Hitchcock in the Connecticut Valley. This glaciolacustrine lake may have existed for 2500 years. Many smaller lakes were shorter-lived, but they too can be identified by their characteristic sediments and level landforms.

In Massachusetts natural lakes are among the most important recreational features resulting from

glaciation. As ice cleared the land of soil cover, debris was dumped, clogging valleys and damming streams to form lakes, swamps and waterfalls common to New England.

Physiographic Regions

Massachusetts lies within the major physiographic province known as the Appalachian Highlands. The Highlands are divided into seven subprovinces; Massachusetts is located in the subregion known as the New England Uplands. The Commonwealth is further divided into nine major physiographic regions, as shown in figure III-2.

The *Taconic Mountains* form a mountain border with New York State. Elevations range from 1200 to 2800 feet; Mount Greylock, the state's highest peak (3491'), is located in the northeastern part of the province. The Taconics, although classified as hills, comprise the state's only "mountainous" region.

The *Berkshire Valley,* a long narrow lowland running north-south between the Taconic Mountains and the Berkshire Hills, includes both the Hoosic and Housatonic river valleys. The area, underlain by less resistant rock than the surrounding regions, has been eroded to provide a striking contrast with the bordering hills.

The *Western Highlands* (Berkshire Hills), lie between Berkshire Valley and the Connecticut Valley. The topography is rugged; elevations, which range from 700 to 2000 feet, are highest in the Hoosac range of hills in the northwestern part of the province. The eastern section is deeply dissected by major rivers which have cut deep gorges as they flow east and south to the Connecticut River.

The *Connecticut Valley Lowland* is a wedge-shaped area extending north-south from southern Vermont to the Connecticut border. The Lowland, about 20 miles wide at its greatest width, is located in a large geologic fault bordered by an escarpment on either side of the valley. The topography is generally flat to rolling, except for a few traprock ridges such as Mt. Sugarloaf and Mt. Tom which rise above the valley and provide pleasant relief.

The *Central Highlands* are comprised of the eroded plateau east of the Connecticut Valley lowland. The topography is generally rugged but more subdued than that of the Western Highlands. Elevations range from 700 to 1200 feet, except for monadnocks such as Mount Wachusett (2006'). The eastern part of the Highlands is bounded by an escarpment that slopes down to join the Coastal Hills.

The *Coastal Hills* region is the largest subprovince in the state. Its low-lying plateau (elevations 200-700 feet) surrounds the Boston and Narragansett basins and borders the Coastal Lowlands. Best known of the Coastal Hills are the Blue Hills which rise to the south of Boston and dominate the skyline for miles around.

The *Boston Basin* is a very distinct topographic feature of the Massachusetts coast. Its lowlands (0-150 feet) are surrounded by hills which rise abruptly to form a ring around the entire basin. The major relief within the lowlands area is provided by a series of more than 50 drumlins.

The *Narragansett Basin,* similar to Boston Basin, is a lowland (0 - 200 feet) surrounded by the eastern uplands of the Coastal Hills.

The *Coastal Lowlands* include a narrow strip in the northeastern part of the state and all land south of Narrangansett Basin, Cape Cod and the Islands of Nantucket Sound. Continental glaciation formed the Cape and the Islands and present day topography shows the effects of ice deposition and erosion. The landscape is flat to rolling and elevations range from sea level to 200 feet. Much of Cape Cod is still in the process of change; both wind and wave erosion and deposition work to change the shape of the present landscape.

CLIMATE

Massachusetts has a humid continental climate. Because the state is situated within the Westerly Wind Belt, winds blowing from the western and central United States transfer interior continental weather characteristics to Massachusetts. Consequently, even though the entire eastern boundary of the state borders the Atlantic Ocean, Massachusetts has a continental rather than marine climate. The most striking characteristic of a humid continental climate is the range between summer and winter temperatures. In Massachusetts the average January temperature at most locations is below 32°F, while July temperatures average approximately 72°F. Four distinct seasons - winter, summer, spring and fall - provide a variety of settings for many diverse kinds of outdoor recreation activities.

Three major air masses affect the state: cold dry air from the Arctic and sub-Arctic; cold, damp air from the North Atlantic; and warm, moist air from the Gulf of Mexico. Each air mass has different temperature and moisture characteristics. As they follow each other or meet in varying procession, frequent changes in weather - temperature, humidity, wind direction, wind speed and cloud cover - occur.

The presence of the Atlantic Ocean, however, does have a moderating effect on temperature and precipitation along the coastline. Because of this fact, the state is divided into two climate subdivisions:

1) a strip roughly 10-20 miles wide along the Atlantic Coast, and
2) the interior land.

Temperature

Along the coastal strip winter temperatures are higher than temperatures in the interior and summer temperatures are slightly lower. Inland from the coast higher average elevations and increasing distance from the moderating influence of the ocean bring lower winter and summer temperatures than those along the coast. Daily maximums in inland areas, however, are often higher during the middle of the day. Sea breezes often lower afternoon temperatures along the coast (see figures III-3 and III-4).

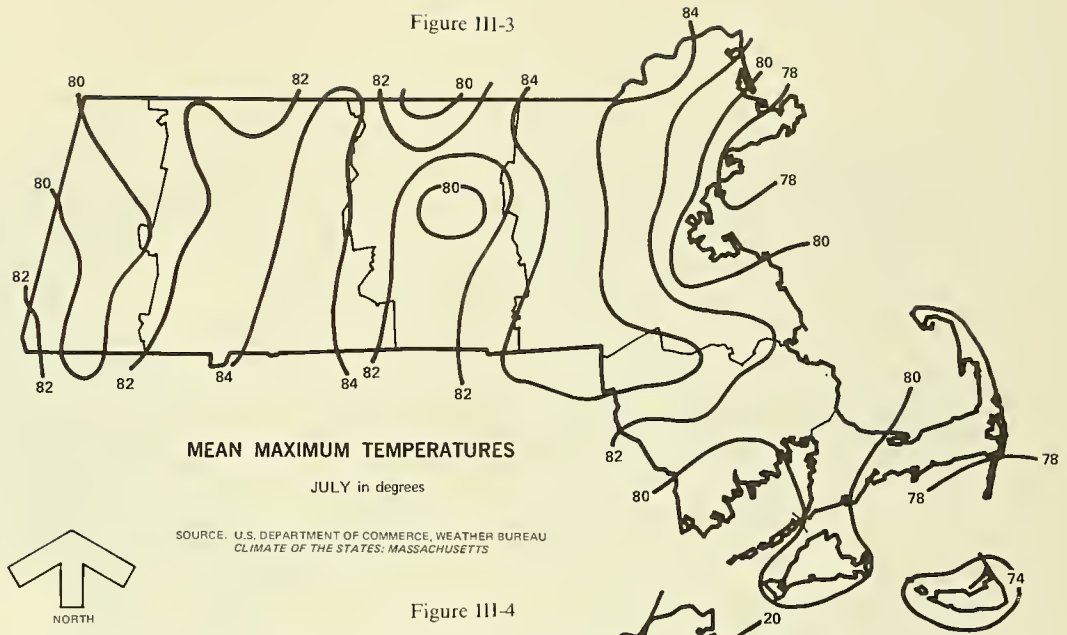
Average temperatures for selected cities are shown in table III-1. Days with subzero readings or hot days with maximums of 90° vary in frequency from year to year. Along the coast perhaps only a few days of extreme temperatures occur during each season; farther inland days of extreme temperatures increase in number.

Table III-1. Average Temperature and Precipitation Data for Selected Massachusetts Cities

	Boston	Worcester	Pittsfield
Average Annual Temperature	50.7°F	48.2°F	44.5°F
Average January Temperature	29.1°F	26.0°F	21.2°F
Average July Temperature	72.2°F	70.8°F	67.6°F
Average Annual Rainfall	50.7″	48.2″	44.24″
Average Annual Snowfall	42.3″	49.4″	72.3″

Source: *Climates of the states: Massachusetts,* U.S. Department of Commerce (Weather Bureau), Government Printing Office, (November 1959), p. 6.

Figure III-3

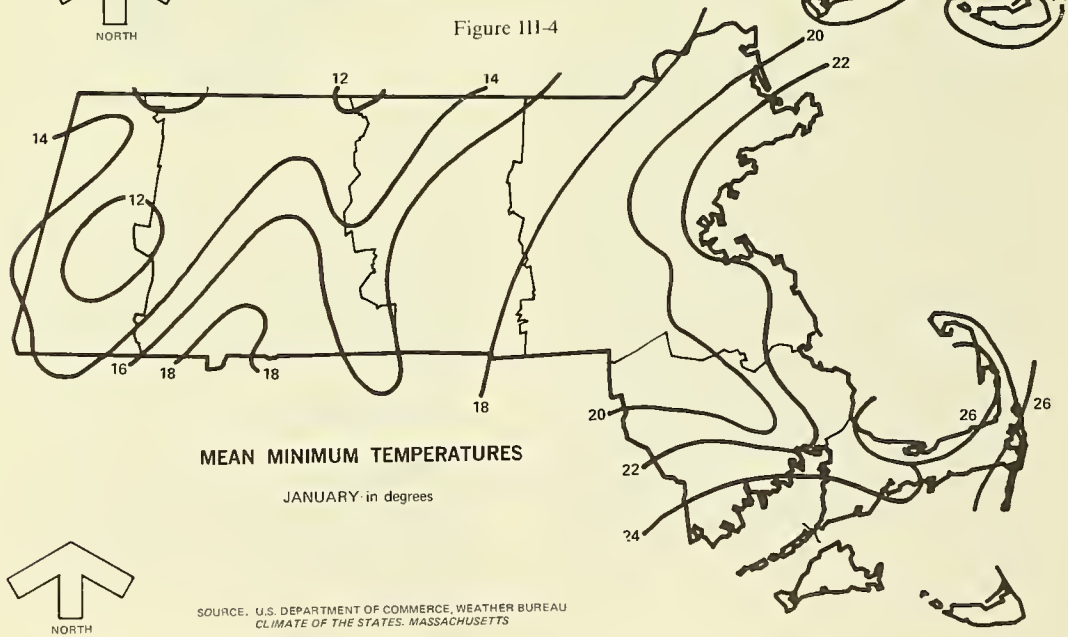


MEAN MAXIMUM TEMPERATURES

JULY in degrees

SOURCE. U.S. DEPARTMENT OF COMMERCE, WEATHER BUREAU
CLIMATE OF THE STATES: MASSACHUSETTS

Figure III-4

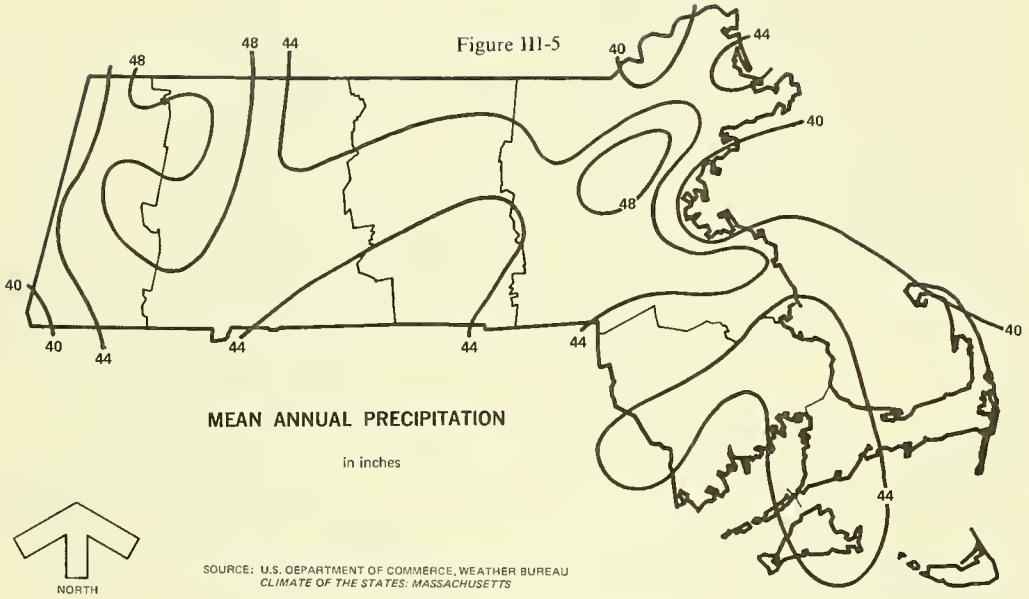


MEAN MINIMUM TEMPERATURES

JANUARY in degrees

SOURCE. U.S. DEPARTMENT OF COMMERCE, WEATHER BUREAU
CLIMATE OF THE STATES: MASSACHUSETTS

Figure III-5



Precipitation

Precipitation, mainly in the form of snow or rain, is evenly distributed throughout the year, with each month averaging 3-3.5″ (see figure III-5). Rainfall in the winter is usually a result of the passage of cyclonic storms; inclement weather may last for several days. During the summer season rainfall is usually a result of thunderstorm activity.

Average annual snowfall increases rapidly from the coast westward: at Nantucket Island the average annual snowfall is 26.5″, at Boston 42″, at Worcester 49″ and at Pittsfield in the Berkshires 72.3″. In fact, less than four inches of snow in a year has been recorded on Cape Cod, while yearly totals of 100″ or more have been recorded at central and western Massachusetts stations.

Northeast blizzards ("Nor'easters") may occur several times during the winter, often dumping a foot or more of snow at one time on the coastal Boston metropolitan region. Nevertheless, within the coastal areas it is unusual to have snow cover for more than three weeks at a time. In the western and central parts of the state, however, snow cover may extend into spring.

WATER RESOURCES

Massachusetts has a variety of water resources. The Atlantic Ocean provides 2000 miles of coastline; in fact, the entire eastern boundary of the Boston metropolitan area is ocean. Boston Harbor itself is dotted with 30 islands, all lying within a 25-mile radius of a population of more than three million. In addition to the miles of shoreline, there are 1325 water bodies totaling about 140,000 acres; the largest is Quabbin Reservoir which contains 24,700 acres.

Within the state are 5600 miles of rivers and streams. The major river is the Connecticut which flows in a north-south direction in the central part of the Connecticut Valley. The Charles, the longest river lying completely within the state, meanders for almost 100 miles through eastern Massachusetts. Twenty-six other major river basins drain the state. The location and distribution of water bodies and streams can be seen on regional maps contained in the Regional Analysis Chapter.

The Cape Cod peninsula separates two major ocean currents from one another. The Labrador Current, a cold southerly flowing current which has its origins in the North Atlantic, brings cool water temperatures to all areas on the north side of Cape Cod. The Gulf Stream, a warm ocean current which flows north from the Gulf of Mexico, affects water temperatures at all areas on the southern side of Cape Cod. Hence average summer ocean water temperatures on the northern shores of Massachusetts may be as much as 15°F. colder than southern shores. This abundance of water resources offers an extremely high potential for such water-based recreation activities as swimming, boating and fishing.

SOILS OF MASSACHUSETTS

Parent rock material, climate and vegetation determine the character of regional soils. Generous precipitation, a cool climate, and natural forest cover have leached the Commonwealth's soils, producing northern grey soils, or podzols, which are typically acid.

As a group, till soils are most abundant, followed by outwash and rough stony soils. With the exception of limestone-modified soils and soils formed on alluvial and lacustrine deposits, Massa-

Figure III-6

chusetts soils have only moderate fertility. The distribution of soil types in the state is shown on figure III-6.

Rough-Stony Soils

Rough-stony soils are located primarily in the western third of the state; some are located in the coast areas north of Boston. Rough-stony soils have little or no agricultural value; they are predominantly woodland with limited pasture use. Many areas were once cleared, but now the abandoned fields are often marked only by crumbling stone walls.

Limestone Soils

Limestone soils are located in the Berkshire Valley. Soils formed on limestone are less acidic than those whose parent materials are schists and granite. Limestone has a neutralizing effect on soil and hastens the decay of organic matter and soil-building. Much of this soil-based land has been cleared and farmed.

Stratified Drift - or Water Laid Material

Stratified drift deposits are found in the Connecticut Valley in isolated areas in northeastern and southeastern Massachusetts and on Cape Cod and the Islands. On these soils drainage is good to excessive, except in low-lying areas where organic deposits form bogs. On these soils cranberries are grown on the Cape and in Plymouth County. Uplands tend to be excessively dry and support scrub vegetation.

Lacustrine Sediments

Lacustrine sediments are the predominant soils of the Connecticut Valley. Formed by glacial lakes these soils provide some of the best agricultural land in the Commonwealth. Located on floodplains these areas are intensively farmed for vegetables, fruits and tobacco.

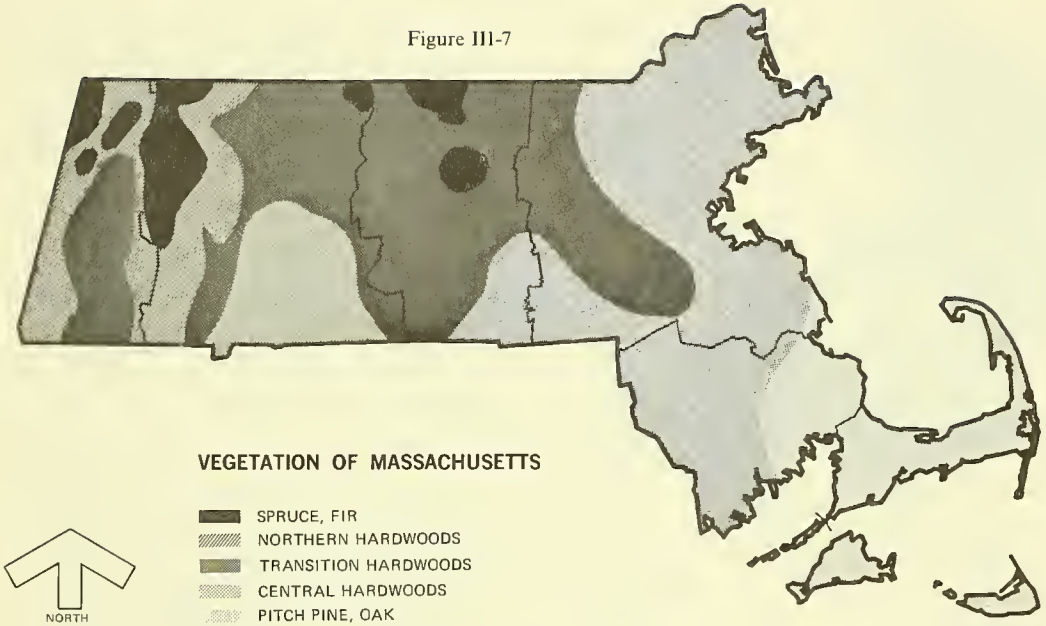
Till

Till is the most abundant kind of soil in the state. Upland till soils tend to have fair-to-good drainage and are stony with occasional bedrock outcrops. On lowlands, in swales, and in depressions drainage is poor and organic deposits have accumulated. Till material is generally very closely related in composition to the underlying bedrock.

Tidal Marsh

Tidal marshes are located along coastal Massachusetts. Except for the production of salt hay, the marshes are not commonly thought of as being agricultural land. These areas, which are daily inundated by salt water, are the richest, most productive lands in the Commonwealth, although they are rarely valued as such. The tidal marsh environment produces organic materials which support a vast chain of marine life vital to Massachusetts' shellfish and offshore fishing resources.

Figure III-7



SOURCE: SOCIETY OF AMERICAN FORESTERS, N.E. SECTION

VEGETATION

Woodlands cover nearly three-quarters of the Commonwealth and without man's influence all but the salt marshes would revert to forests. As agricultural acreage continues to decline, more land becomes forested, although in several areas urbanization has offset this trend. These woodlands are not virgin stands but rather second and third forest growths, reclaiming land that at one time was almost completeiy cleared for timber and farming. Only in small isolated preserves do primeval stands remain.

The variety of Massachusetts' climate, soils, and landforms is reflected in its forest diversity. Second and third growth stands emanating from logged, cleared or burned over land bear little resemblance to the mature forests they have replaced.

The forest regions shown in figure III-7 represent Massachusetts' natural tree communities. Although some individual species have ranges that encompass all of the state, no species can grow in all of the many combinations of moisture, microclimate, or soil that make up forest habitats.

Spruce-Fir

Red Spruce and balsam fir, the trees of the northern evergreen wilderness, appear in Massachusetts on the tops of the Taconics and Berkshires and at high elevations in the Central Highlands. Small isolated stands of black spruce and tamarack, an associated tree, are found in bogs in other portions of the state. Few of the stands are pure, since birch and poplar are associated species found in the spruce-fir forest community. The trees are generally closely spaced and the forest floor is sometimes barren. The soil beneath the spruce forest is nearly always very acid and inhospitable to most plants.

Northern Hardwoods

Where climate and soil are more hospitable the spruce-fir forests gradually blend into the more varied northern hardwood forests. Birch, beech, and maple are the dominant hardwoods; red spruce, hemlock and some white pine are the principal conifers. Northern hardwoods cover the Berkshires, the Taconics, the Central Highlands and many other heavy soil sites in the northern part of Massachusetts. This is the region of brilliant fall color displays as the maples turn yellow, orange and red, the beech golden and the birches yellow.

Transition Hardwoods

As the climate moderates the northern hardwoods grade into the central hardwoods. The number of species increases as trees common to both northern and southern regions are found in varying mixtures.

Central Hardwoods

Oak and hickory are the most common trees of central and southern New England. Where there is more moisture the variety of trees increases to include red maple, black birch, black cherry and hemlock. The swamp areas may include Black

Gum and Atlantic Cedar. Occasionally some southern species and northern hardwoods appear.

Pitch Pine-Oak

Stunted pitch pine-oak forests are found on Cape Cod, on the Islands of Nantucket Sound, and in southern Plymouth County. The soils of the two regions are nearly pure sand and tend to be extremely dry and nearly sterile. Frequent fires have left only the pitch pine which is fire-resistant and sprouts readily as does the scrub oak. If fire could be kept out, good white pine, black, white and scarlet oak could grow here too.

Socioeconomic Setting

This section discusses socioeconomic characteristics of Massachusetts, such as population density, the economic base and transportation.

POPULATION

Massachusetts forms the northeastern terminus of "Megalopolis," the Atlantic Coast urban belt that extends from Portsmouth, Virginia to Portsmouth, New Hampshire. According to the 1970 census, approximately 20% of the nation's resident population, some 40,000,000 people, live in this belt. Within Megalopolis are five of the country's largest cities - Boston, New York, Philadelphia, Baltimore and Washington. It is interesting to note, however, that although Massachusetts is generally considered an urban state, large areas, especially in the central and western sections, have a very low density level and might reasonably be called "open." Nevertheless, the Commonwealth is one of the most highly urbanized states in the nation. Eighty-five percent of the total state population is classified as urban by the U.S. Bureau of the Census. Only four other states - California (90.9%), New Jersey (88.9%), Rhode Island (87.1%) and New York (85.6%) - and the District of Columbia (100%) have a higher urban population.

The population of Massachusetts has increased from 400,000 in 1790 to 5.7 million in 1970. Although the population has been continually increasing and is expected to increase in future years, the average rate of growth in Massachusetts was slower than the national average for 1960-1970. During that ten-year period the U.S. population increased by 13.3%, the Northeast Census Region by 9.8%, and the six New England states by 12.7%. Massachusetts' population increased by 10.5%. Table III-2 indicates population figures for the New England states in 1900, 1950 and 1970.

Table III-2.
Population of the
New England States:
1900, 1950, 1970

State	Year		
	1900	1950	1970
Connecticut	908,355	2,007,280	3,032,217
Maine	694,466	913,774	993,663
Massachusetts	2,802,649	4,690,514	5,689,170
New Hampshire	411,588	533,242	737,681
Rhode Island	428,556	791,896	949,723
Vermont	343,641	377,747	444,732

Sources: 1900 and 1950: *Historical Statistics of the United States, Colonial Times to 1957,* U.S. Bureau of the Census, Government Printing Office (1960), p. 12.

1970: *1970 Census of Population,* U.S. Department of Commerce, Bureau of the Census (February 1971), pp. 2-21.

Massachusetts has always had the largest population in New England. In 1900 fifty percent of New England's population resided in Massachusetts; by 1970 this had dropped to 48%.

Since colonial times there has been a significant change in the population distribution in Massachusetts. In 1790 the majority of the people (86.5%) lived in areas classified as rural; by 1850 half the state's population was classified rural and half urban; in 1970 most Massachusetts residents (84.6%) lived in areas classified as urban by the United States Bureau of the Census.

Population densities are highest in the eastern part of the state. Almost two-thirds of the state's 5.7 million people live in the cities and towns of the Eastern Massachusetts Region.

EDUCATION AND INCOME

Recreation studies have usually shown that interest and participation in outdoor recreation activities increases as education and income levels rise. The following analysis compares Massachusetts education and income levels with those in New England, the Northeast and the United States.

The first public school in America was founded in Massachusetts in 1635. Since that time public and private schools have increased in number so that currently there are 124 accredited schools of higher learning in the Commonwealth. In 1970 there were seven major universities in the Boston metropolitan area; many smaller colleges and business schools are also located in the area.

In 1970 the median number of school years completed by Massachusetts citizens over 25 was 12.2 years, compared to 12.1 for the other New England states. Fifty-eight percent of Massachusetts

people over 25 years had completed high school. The median income of families and unrelated individuals is substantially higher in Massachusetts than in New England and the United States. In 1970 the median income of Massachusetts residents was $8607, compared to $7863 for New England. In 1970 the percentage of families with an income of less than $3,000 was 6.4%. Eighty-one percent of Massachusetts families had an annual income of $6,000 or more.

ECONOMIC BASE

This section describes some of the major industry groups in Massachusetts, with emphasis on those that effect some facet of recreation.

Fishing

From colonial times to the present fishing has been one of the most important sectors of the Massachusetts economy. In fact, fishing is the oldest industry in Massachusetts and contributes thousands of dollars to the state's economy. In the early days colonial fisherman fished waters close to the home ports of Boston, Gloucester and New Bedford, but by the mid-1700's American fishermen were gathering fish from the waters off the entire northeast coast. Fishing in the 20th century is still a vital facet of the Massachusetts economy. It has been estimated that in 1965 there were 35,000 workers employed in fishing and fish processing. The state's annual catch, which includes flounder, cod, haddock, pollock, whiting, ocean perch, scallops and lobsters, ranks third in U.S. fish sales.

In addition, much interest has been given to sport fishing. Numerous charter boats take groups and parties deep-sea fishing from ports all along the Massachusetts coast.

Vacation and Travel

Massachusetts' varied physiography, miles of Atlantic coastline, and four-season climate contribute to a diverse setting for year-round recreation. Four areas in the state - Boston, the Berkshires, Cape Cod, and the Islands of Nantucket Sound - attract an unusually large number of visitors, both in-state and out-of-state.

Cold snowy winters in the rugged hills of the Berkshires in the western part of the state provide a natural setting for such winter activities as skiing and tobogganing. In the fall the crisp air turns the leaves to brilliant shades of red, orange and yellow; thousands of people travel along the Mohawk Trail to view the spectacular foliage. Cultural events such as concerts at Tanglewood in Lenox, and natural features such as cool mountain lakes, attract numerous summer visitors.

Boston, the capital of Massachusetts, is the largest city in New England. Site of the early stages of the American Revolution, Boston is rich in history and early American architecture. Tourist travel in Boston is substantial. Visitors may walk along the Freedom Trail, a walking route connecting major points of early American history; they may view the historic waterfront, visit the newly opened New England Aquarium, and tour the U.S.S. Constitution ("Old Ironsides"). famous for its victories in the War of 1812 and the oldest commissioned ship in the U.S. Navy. Boston is also rich in cultural and educational activities. Many of these attract visitors from all over the world.

Cape Cod and the Islands of Nantucket Sound are a nationwide attraction. Miles of beaches, sand dunes and a variety of recreation, lodging, and eating facilities bring thousands of visitors to the Cape, Martha's Vineyard and Nantucket during all seasons. Milder weather in the marine locations of the Cape and the Islands allow such activities as golf to be played year round.

Manufacturing

Massachusetts was an early leader in American industrialization. Some of the first textile mills in the country were located in Rowley, Beverly, Lawrence and Lowell. Lawrence and Lowell, both situated on the banks of the Merrimack, were originally towns created by textile companies. During the 1930's the textile industry in Massachusetts suffered a decline; many mill-owners closed down their mills and moved their operations south. Nevertheless, today there are approximately 45,000 textile workers in Massachusetts.

The manufacture of shoes has always been a valuable part of the Massachusetts economy. There are major footwear plants in Beverly, Boston, Worcester, Brockton, Lynn and Marlboro. Currently the shoe and leather industries employ about 41,000 workers.

Production of electronic equipment has become in recent years a very significant part of the Commonwealth's economy. Firms producing strategic components for radar, electronic items for antisubmarine warfare, missiles and spacecraft employ nearly 100,000 workers. The electronics industry employs many highly skilled workers and highly educated scientists. In recent years there have been as many as 30,000 scientists employed by electronics firms in Massachusetts.

The instruments industry is also important in the Massachusetts industrial scene. Currently there are approximately 30,000 workers employed in constructing and designing precision instruments.

Forestry

Although Massachusetts is highly urbanized, 65% of the state is forest covered. Eighty-eight percent of the forested area is privately owned and maintained; the majority of the remaining land is owned by the state. Forests are not only a source of wood but also a repository for a number of other resources, including recreation, wildlife, and open space.

The forestry industry is one of the state's oldest; wood and wood products have been produced for over 200 years. In 1964 there were 324 wood product firms in Massachusetts turning out furniture, wooden containers, prefabricated buildings, and other miscellaneous wood products. Furniture manufacturing accounts for almost half of all wood production.

Massachusetts' forest industries play a large role in local economies, particularly in the western part of the state. Forest owners and loggers receive $1,500,000 annually from the sale of sawlogs and other timber products. The annual income attributable to wood use in Massachusetts exceeded $300,000,000 in 1952 although 90% of the wood used in production was imported from other states.

At present more wood is being grown each year in Massachusetts than is harvested by the state. It is probable that the economic benefit would be substantial if more native wood were used. The problem is that the timber quality in the state is generally poor.

Forest lands, in addition to their function in providing wood products, play a very important role in providing the space, setting, and environment for many outdoor recreation activities, including hunting, hiking, camping, picnicking, recreation-vehicle travel, fishing and wilderness camping. The fact that the majority of these lands are privately owned suggests that private enterprise must play a major role in recreation.

Increasing pressure is being brought on forest lands for second-home development by the urbanite and suburbanite. This influence often removes these lands from timber production and public recreation use.

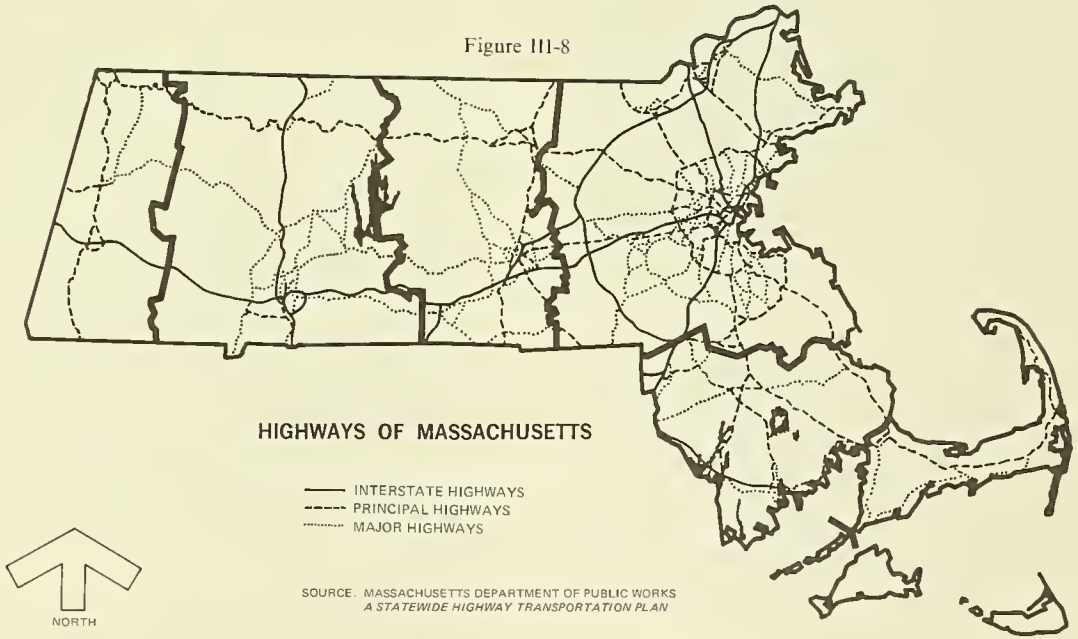
Agriculture

Agriculture in the Commonwealth has always been and still is a major factor in the state's economy. Its continued importance is mostly due to adoption of new technology and application of improved management and marketing techniques. Together these factors permit agriculture to remain a viable contributor to the state's economy. The number of farms in Massachusetts is declining but total gross farm income shows an upward trend. Total gross farm income for 1966 was in excess of $170 million.

Dairy products contribute about 30% to the state's total farm income and are the largest single commodity group. The poultry (17%) and the greenhouse-nursery forest products (16%) commodity groups rank second and third respectively. Other important commodity groups are fruits, vegetables, meat animals, and tobacco.

Farm lands are important to recreational considerations because they represent significant open-space areas and add to the scenic attractiveness and setting of the state. In addition these lands represent a large potential for private recreational development. Many of the extensive recreational activities can be carried on as an adjunct to a farm operation. These would include, when appropriate, such activities as hunting, fishing, snowmobiling, hiking and horseback riding.

Figure III-8



TRANSPORTATION

Massachusetts has an intricate network of transportation routes. Thousands of miles of highways crisscross the state. Railway lines traverse north-south and east-west. Boston, particularly, is the hub of the spokes of many routes; other metropolitan centers in the state are also focuses of major transportation systems.

Highways and Motor Vehicles

In 1968 the public road network in Massachusetts totaled 28,842 miles. State highways, accounted for 9% of these miles; the remainder were owned and maintained by local and regional agencies within the Commonwealth (see figure III-8). The Department of Public Works (DPW) has estimated that annual highway travel will jump to 37 billion miles by 1990, an increase of 74% over 1965 travel. Motor vehicle registration has increased substantially. In 1950 there were 27 motor vehicles for each 100 persons in Massachusetts; by 1965 the number had risen to 40 per 100 persons. DPW estimates that by 1990 the figure will be 50 motor vehicles per 100 persons. Registration in 1967 totaled 2,193,000; by 1990 this figure is expected to soar to 3,527,000.

Railroads

Since 1900 there have been very few changes in New England railway routes. In fact, in the last 30 years New England railway mileage has decreased from 7600 miles to approximately 5600 miles. Massachusetts, which comprises 27% of New England railroad mileage, has also experienced a decline in total railway miles since 1940.

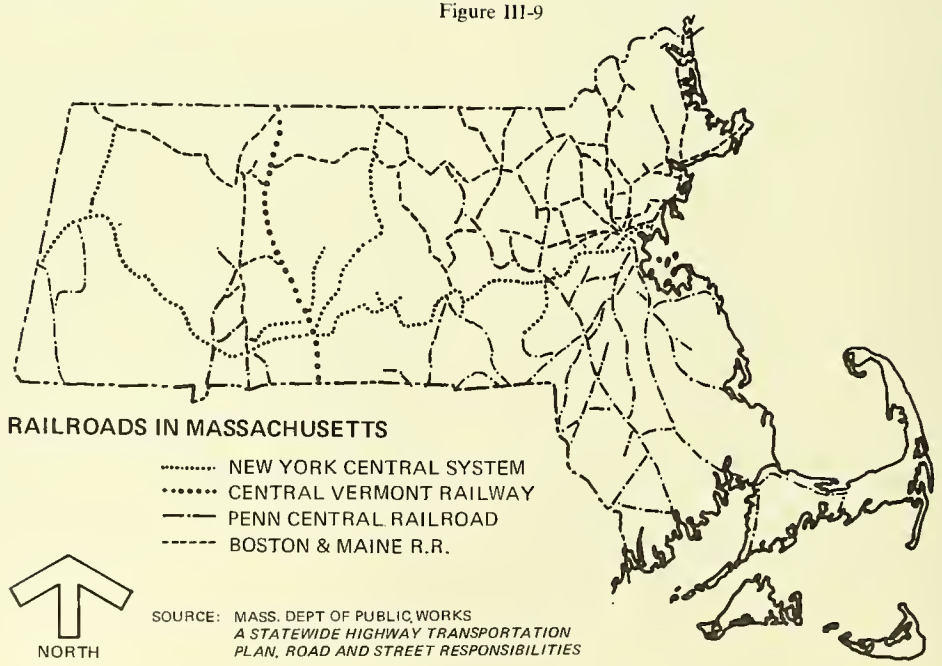
The Commonwealth is primarily served by three major railway companies: Penn Central (formerly the New York, New Haven and Hartford), Boston and Maine, and Boston and Albany. In southern New England Penn Central has a virtual monopoly on railway traffic (see figure III-9).

All railroad lines in the Commonwealth have suffered a decrease in passenger traffic. Presently the Massachusetts railroad system is in jeopardy. Government subsidies have been given in order to extend its operating life.

Air and Water Transportation

Air transportation is the fastest growing means of transportation. Most cities and resort areas in Massachusetts are served by an airport. The largest airport in the state, Logan International Airport, is situated on a 2000-acre site located in East Boston on the north side of Boston Harbor. Traffic at Logan Airport has increased substantially in the last few years. Eighteen airlines currently operate out of Logan. The number of persons traveling on regularly scheduled airline flights has more than doubled in the ten-year period 1955-1965. During this same period the number of international flight passengers has multiplied four times. Continuing increases in both air passengers and air freight are expected. Many other smaller airports are located throughout the state. In 1965 the Massachusetts Aeronautics Commission listed 61 authorized commercial airports in Massachusetts. Twenty-two of these were maintained by cities and towns; 33 were privately and commercially owned; six were for privately owned seaplane bases. Sixty-six other private landing areas were registered as well as 19 privately used heliports.

Figure III-9


RAILROADS IN MASSACHUSETTS
NEW YORK CENTRAL SYSTEM
CENTRAL VERMONT RAILWAY
PENN CENTRAL RAILROAD
BOSTON & MAINE R.R.
NORTH
SOURCE: MASS. DEPT OF PUBLIC WORKS
A STATEWIDE HIGHWAY TRANSPORTATION PLAN, ROAD AND STREET RESPONSIBILITIES

Water transportation was a very important transportation method for early settlers in Massachusetts. Barge canals connected some of the major cities. Today the Cape Cod Canal is very important in water transportation, with all types of boats passing through the canal from small pleasure boats to ocean-going freighters and military ships.

From the 17th to early 19th centuries waterpower turned the wheels of industry in North America. Tanneries and iron foundries, as well as gristmills, sawmills and textile mills, needed waterpower to operate. Essential to the operation were millpower and navigation canals.

Urban and industrial development have obliterated most of the navigation canals, but fragments of these canal installations still exist today. Clusters of these canals survive in Fall River, Taunton, Lawrence, Lowell, Worcester and Holyoke. Traces of the Blackstone Canal, which stretched from Worcester to Providence, Rhode Island, still remain. About 20 miles of the original 27-mile Middlesex Canal, which operated from Lowell to Charlestown, have been preserved.

These remaining canals hold exceptional historical and recreational value. With the improvement of their water quality and public access these canals could help satisfy important recreational needs for swimming, picnicking, scenic viewing, boating and fishing. If properly restored canals could also offer unique forms of interpretative history - a journey into the past.

Cruise, tour boats, and passenger ferries - a growing Massachusetts industry - provide pleasurable excursions for many resident and nonresident recreationists. These boats operate all along the Massachusetts coastline and provide cruises to such places as the Boston Harbor Islands, Nantucket, Martha's Vineyard, Provincetown and Nantasket.

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RESPONSIBILITIES AND PROGRAMS

Responsibility for providing outdoor recreation opportunity is divided among various public and private agencies. Effective coordination of individual agency roles is an extremely difficult but vitally important task if outdoor recreation needs are to be met. In order for this coordination to take place each agency must understand the role of other agencies involved in outdoor recreation. This section outlines the responsibilities and programs of each of the four basic agency groupings - federal, state, local and private - in order to facilitate this understanding.

Federal Government

The federal government has two major outdoor recreation roles in Massachusetts. The first is management of outstanding natural, cultural and historic resources that are established as having national significance. On these lands the federal government also provides outdoor recreation opportunities through its multiple-use management programs.

The second major role of the federal government is its technical and financial assistance programs. With these programs the federal government assists the state in acquiring and managing outdoor recreation resources. It also aids the private sector and enables the state to provide assistance to other state agencies and local government units.

Federal ownership of lands classified as recreational amounts to about 75,000 acres, or approximately 10% of Massachusetts' total recreation lands. These lands are not distributed evenly throughout the state since most are located in the Central Highlands, Eastern Massachusetts and Cape Cod Planning Regions. Also many of these lands were acquired and are managed primarily for other purposes, with outdoor recreation being a by-product of multiple-use management.

Listed below are the major federal aid, assistance and land management programs either currently or potentially having a significant impact in meeting Massachusetts' outdoor recreation needs.

DEPARTMENT OF AGRICULTURE

Federal Extension Service shares in a federal-state-county partnership in financing, planning and executing educational programs. In Massachusetts the Agricultural Experiment Station at the University of Massachusetts in Amherst is responsible for this program. Traditional agricultural functions have been expanded to include educational programs for the disadvantaged in urban as well as rural areas. These programs involve youth work, recreation, resource development and public affairs.

U.S. Forest Service promotes conservation of the nation's forest lands, manages natural resources, and provides water, forage, timber, wildlife and recreation research. It also offers grants, technical services and forestry assistance to states, industries, private individuals and other federal agencies. Massachusetts has taken advantage of several of these programs.

The Division of Forests and Parks in the Massachusetts Department of Natural Resources (DNR) receives approximately $500,000 per year from the Clarke-McNary Planting Stock Grants based on a reimbursement of up to 50% for the cost of forest fire control. Forests and Parks also receives between $40,000 - $50,000 per year from the Cooperative Forest Management Grants in a reimbursement approaching 50%. These monies are used to provide assistance to private landowners for forest management. The USFS, Division of Management Services, was established to improve the management of forest lands through in-service training programs for state personnel.

Soil Conservation Service conducts a national program for soil and water conservation and provides technical and financial assistance to local sponsors of watershed projects for flood prevention, fish, wildlife and recreational development and augmentation of municipal water supplies. It also assists landowners and recreation area operators in developing income-producing enterprises on private lands.

The small watershed program (P.L. 83-566, as amended) makes cost-sharing grants to local spon-

Soil Conservation Service

Programs	Available To	General Description
Soil Conservation Assistance	State Local	Assistance in planning and development of income-producing recreation and fish and wildlife enterprises.
Watershed Protection and Flood Prevention	State Local	Provides technical and financial assistance in planning and carrying out projects to protect, develop and utilize land and water resources in small watersheds.
Small Watershed Projects	State Local	Planning and development of small watershed projects for flood control, recreation, irrigation, water supply, fish and wildlife.

sors up to 50% of the cost for land acquisition, easements, rights-of-way, and facilities needed to develop the water-oriented recreation potential of the project area. The DNR - through its Divisions of Fisheries and Game, Water Resources, and Forests and Parks - participates in this program as the local sponsoring agency and will continue to do so in the future.

DEPARTMENT OF DEFENSE

Departments of Army, Navy and Air Force are responsible for managing military lands and their renewable resources. In Massachusetts lands owned by the Department of Defense include a variety of military installations, some of which are open to the public for hunting and fishing through agreements with the Massachusetts Department of Natural Resources' Division of Fisheries and Game.

Army Corps of Engineers investigates, plans, operates, designs, constructs and maintains public works projects for navigation, beach erosion control, hurricane flood protection, major drainage, flood control and related water resources. It also provides for wildlife management and outdoor recreation opportunities.

Significant land areas owned by the Corps in Massachusetts include three dry-bed flood control sites in the Connecticut Valley totaling over 4,000 acres, five reservoirs in the Central Highlands totaling more than 8,000 acres, and one 600-acre dry-bed site in Eastern Massachusetts. The Cape Cod Canal area provides significant recreational opportunities and has one of the highest national attendance figures for the Corps.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Community Resources Development Administration includes the Land Development Division which administers grant programs for acquisition and

Army Corps of Engineers

Programs	Available To	General Description
Beach Erosion Control	State Local	Control beach and shore erosion of public shores.
River and Harbor Improvement	State Local	Development and improvement of inland and intracoastal waterways and great ponds for commercial and recreational uses.
Small Boat Harbors	State Local	Development of harbors for refuge.
Federal Water Project Recreation Act (P.L. 89-72)	State Local	Consideration of recreation and conservation potential of all resource projects.

Community Resources Development Administration

Programs	Available To	General Description
Open Space Land Grants	State Local	To acquire and develop urban land areas for permanent open space use and facility improvements.
Urban Beautification	State Local	To beautify publicly owned open spaces.
Historic Preservation Grants	State Local	To acquire, restore or improve historic or architecturally significant sites in urban areas.

development of open space land and acquisition, restoration or improvement of historic sites.

Renewal Assistance Administration offers comprehensive assistance in development of urban outdoor recreation areas, preservation of environmental quality, and acquisition and development of urban open-space land. Open Space Land Grants, Urban Beautification Programs and Historic Preservation Grants (listed above) are also administered by the Renewal Assistance Administration.

Urban Management Assistance Administration provides technical assistance, advice and guidance to states, metropolitan areas, nonmetropolitan regions, counties and localities for comprehensive urban planning. Additionally it administers the Comprehensive Planning Assistance Program (authorized by Section 701 of the Housing Act of 1954, as amended) which provides state, regional and local assistance for comprehensive land use planning. The two agencies in the Commonwealth funded under the "701" program are the Office of State Planning and Management (OSPM) which acts as the state clearinghouse for federally funded projects, and the Department of Community Affairs (DCA) which administers planning grant funds for this program. The 12 regional planning agencies established in the Commonwealth have had a major function in the planning responsibility. They will utilize the major portion of the HUD "701" monies in 1972 because of the recent federal emphasis on regional planning rather than local or state planning. A total of 250 "701" studies have been made through DCA, with the greatest percent of funding going to the Metropolitan Area Planning Council (MAPC), the largest and most urban of the 12 regional councils. Out of the state's 351 municipalities 214 have participated in the planning grant funds.

DEPARTMENT OF INTERIOR

Bureau of Outdoor Recreation (BOR) recommends and guides government outdoor recreation policy and planning; coordinates federal programs relating to outdoor recreation and open space; and provides assistance to federal, state, local and private efforts in promoting outdoor recreation opportunities. The Bureau administers the federal Land and Water Conservation Fund Act of 1965 which provides 50% reimbursement to states and local government units for planning, acquiring and developing outdoor recreation and open-space areas and facilities. To date Massachusetts has received approximately $20,000,000 under this program. To be eligible to receive funds a state must submit and have approved by the Bureau a State Comprehensive Outdoor Recreation Plan. The Commissioner of Natural Resources is the liaison officer for Massachusetts. Cities and towns in Massachusetts apply for and receive BOR funds from the Department of Natural Resources for acquisition and development projects.

Bureau of Sport Fisheries and Wildlife manages and conserves the nation's wildlife resources as well as lands and waters in the National Wildlife Refuge system. It also provides research, assistance and grants to states, universities and other federal agencies for enhancement of fish and wildlife resources. In Massachusetts three wildlife refuges (Parker River, Great Meadows and Monomoy), totaling about 12,200 acres, are owned by the Bureau. Federal development at these areas has improved and protected the wildlife habitat. Limited facilities have been added to these areas to accommodate nature study and fishing.

In addition DNR's Division of Fisheries and Game has received federal funds under the Dingell-Johnson Act, a program that provides financing for cooperative projects to assist in research, development, land acquisition and coordination of activities involving fish restoration. Fisheries and Game has also received aid under the Pittman-Robertson Act, a program that provides financing for cooperative projects involving research, development, land acquisition, habitat maintenance and wildlife restoration. The Commonwealth received $226,000 in funds from these programs in fiscal 1971. These funds can provide up to a 75% reimbursement for research, acquisition and development.

Bureau of Sport Fisheries & Wildlife

Programs	Available To	General Description
Wildlife Restoration Federal Aid (P-R)	State	Conservation and restoration of wildlife resources.
Fish Restoration Federal Aid (D-J)	State	Fish restoration and management.
Anadromous Fish Restoration Act	State Local	Provides funds or anadromous fish restoration and management.

National Park Service plans and administers the natural, historic and recreational sites within the National Park System. To preserve the nation's natural and cultural heritage it also administers historic sites, national seashores, lakes, shores and scenic highways. Historic preservation monies are also authorized through the National Historic Preservation Act of 1966. In Massachusetts the Park Service operates the Cape Cod National Seashore which runs along the outer fringes of seven towns on Cape Cod and includes more than 27,000 acres within its boundaries. The Park Service also manages Minuteman National Historic Park, a 500-acre open-space historical landmark located in Concord, Lexington and Lincoln.

DEPARTMENT OF LABOR

Manpower Administration provides work-training service programs for youths and adults at rural and urban centers.

Since 1970 the Manpower Administration has received a yearly supplemental appropriation for its Recreation Support Program. This program has served disadvantaged urban youths from 6 to 13 years of age in the nation's 100 largest cities. In Massachusetts such communities as Boston, Somerville, Cambridge, Lynn, Springfield and Worcester have been recipients of funds from this program. The funds (approximately $500,000) have assisted these cities in purchasing athletic equipment and arts and crafts materials and made it possible to take youngsters on day outings. The Commonwealth believes that this program has given some of its disadvantaged youth a meaningful summertime experience.

DEPARTMENT OF TRANSPORTATION

Bureau of Public Roads administers federal aid programs for improvement of highway systems. It also conducts safety, planning and research programs for highway improvement.

Manpower Administration

Programs	Available To	General Description
Special Impact Project	State Local	Directed to solution of critical employment problems in urban areas. Work training usually in areas of community betterment.
Operation Mainstream	State Local	Training programs for low-income adults to gain permanent employment. Projects contribute to betterment and beautification of communities.
Neighborhood Youth Corps	State Local	Part-time work and on-the-job training for disadvantaged youths. Work includes conservation and recreation projects.
New Careers	State Local	New jobs for those 18 or over in health, education, welfare and public safety programs.
On-the-job Training Programs	State Local	Outdoor recreation-related occupations.
Recreation Support	100 largest cities	A supplemental summer program that has continued since 1970 to expand the recreation opportunities of disadvantaged youths.

Bureau of Public Roads

Programs	Available To	General Description
Highway Beautification Aid	State	Billboard and junkyard control; landscaping.
Highway Systems Federal Aid	State	Highway access to recreation areas; scenic roads; recreation and rest areas.

Under the Highway Beautification Program funds have been made available to the states for improving and enhancing scenic and recreational resources along highways by removing billboards, screening off junkyards, and providing recreation and rest areas. In Massachusetts the Department of Public Works is currently proposing various projects to utilize federal highway funds for these purposes. The Massachusetts DPW receives $45,000 for fiscal 1972 to screen off junkyards and the Department is hoping to receive at least $20,000 a year for billboard removal.

INDEPENDENT FEDERAL AGENCIES

Council on Environmental Quality: The National Environmental Policy Act of 1969 was a major step in federal responsibility for environmental quality. One of the results of the Act was the establishment of the Council on Environmental Quality which assists the President in the preparation of the Environmental Quality Report and recommends a national policy to improve environmental quality. The Council also conducts environmental quality research.

Environmental Protection Agency is charged with mounting an integrated attack on the environmental problems of air and water pollution, solid-waste management, pesticides, radiation and noise. It has the responsibility for establishing and enforcing environmental standards, conducting studies into the causes and effects of pollution, developing methods of pollution control and determining environmental consequences of man's actions. In addition the Environmental Protection Agency promotes environmental protection efforts at all levels of government by providing technical and financial assistance to state, regional and local jurisdictions.

Federal Power Commission has the authority to control the marketing of electricity and the management of related physical facilities of nonfederal

Environmental Protection Agency

Programs	Available To	General Description
Air Pollution Control Grants	State Local Interstate	Assistance in administering air pollution control programs.
Water Pollution Control Grants	State	Assistance in administering water pollution control programs.
Sewage Treatment Facilities Grants	Municipalities	Assistance in constructing waste treatment plants.

hydroelectric projects. By the procedural conditions under which the Commission operates, all projects to be licensed or relicensed after 1963 are required to consider outdoor recreation in project planning and operation. Exhibit R, which is a part of every license application, is designed to satisfy this requirement.

General Services Administration, through its Property Management and Disposal Services division, regulates and develops policies for a property disposal program in which federal land can be declared excess and turned over to municipalities or states for park and recreational use. Under this program military lands can be declared excess property and transferred to state or municipalities under the President's Legacy of Parks Program; continued emphasis is being given to underutilized lands near urban areas.

Water Resources Council, established by the Water Resources Planning Act (P.L. 89-80), is a coordinating agency for comprehensive water and related land resources planning. The Council administers a program of financial aid to states for the promotion of comprehensive water and land resource planning under Title III of the Planning Act. These funds are distributed to states according to population, land area and need for river basin planning. In Massachusetts DNR's Division of Water Resources has made use of these funds for the financing of various planning reports. These publications include *A Summary of Massachusetts State Laws, Policies and Programs Pertaining to Water and Related Land Resources* (1971); *Compilation and Summarization of the Massachusetts General Laws, Special Laws, Pertinent Court Decisions, etc. Relating to Water and Water Rights* (1970); *Report on Water Resources Management* (December 1969); *Preliminary Report on Development of Mathematical Model for Ipswich River* (May 1968); *Neponset River Basin Floodplain and Wetland Encroachment Study* (1971).

The New England River Basins Commission, authorized under Title II of the 1965 Federal Water Resources Planning Act, receives $43,000 from each New England state (this amount matched by federal funds) to serve as principal agent for coordinating all plans for the development of water and related land resources in New England. Current projects under this program include the North Atlantic Regional Water Resources Study, the Northeastern U.S. Water Supply Study, the Connecticut River Comprehensive Study and the Southeastern

New England Study (SENE). The SENE Study is especially significant because the area under observation has conflicting resources, is both urbanized and industrialized, and represents nearly one-half of New England's population and only approximately 7% of its land area. This project, which will utilize state and federal funds, is planned for four years at an estimated cost of $4 million.

State Government

The state plays a large role in providing outdoor recreation opportunities in Massachusetts, particularly in the resource-oriented areas of the state. Major state responsibilities are: 1) to plan, acquire, develop, and manage lands of a regional or statewide significance for public recreational use; 2) to protect unique natural and historic resources of regional or statewide significance; 3) to manage land and water (including marine) resources for recreational use and commercial profit; 4) to devise long-range comprehensive statewide outdoor recreation plans and develop recreation research projects; and 5) to fund and administer recreation, forestry, fishery, wildlife and environmental pollution abatement programs.

In a recent and continuing reorganization of Massachusetts state government, nine secretariats were established and all state departments, agencies and commissions were assigned to one of these executive offices (see figure IV-1). Of these nine offices, five have significant functions in acquiring and preserving outdoor recreation and open space areas in Massachusetts. Departments with recreation functions falling under the jurisdiction of these five offices are discussed in terms of their contributions and responsibilities in outdoor recreation.

EXECUTIVE OFFICE OF COMMUNITIES AND DEVELOPMENT

The Executive Office of Communities and Development assists communities in growth and development by maximizing physical and economic potentials - including finance, management and economic development planning.

Department of Commerce and Development acts in an advisory capacity for regional and metropolitan planning, and through its Division of Tourism promotes and supports outdoor recreation in the Commonwealth.

Department of Community Affairs administers the federal "701" planning (see section under U.S. Department of Housing and Urban Development). It also develops community and environmental programs for improvements in water, parks, urban beautification, and recreation centers; establishes a financial program identifying the required participation by federal agencies, the Commonwealth and its municipalities; and assists in full utilization of open space and conservation of natural resources.

EXECUTIVE OFFICE OF EDUCATIONAL AFFAIRS

The Executive Office of Educational Affairs attempts to enrich the cultural quality of the environment through a coordinated system of public education for citizens of all ages. The University of Massachusetts in Amherst provides several research centers which were established to assist state, federal and other agencies concerned with the preservation of natural resources including:

Cooperative Wildlife Research Unit provides technical assistance to state and other wildlife agencies and utilizes federal funds through grants from the Wildlife Management Institute and the Massachusetts Division of Fisheries and Game.

Cooperative Fishery Unit, supported by the U.S. Bureau of Sport Fisheries and Wildlife, the Massachusetts Division of Fisheries and Game, and the Division of Marine Fisheries, provides education, assistance and research for all agencies concerned with the management of the state's fisheries.

Cooperative Extension Unit provides educational information and guidance in agriculture, natural resource development, consumer and youth services.

Agriculture Experiment Station conducts scientific research on problems pertaining to all renewable resources.

Water Resources Research Center conducts research and develops programs relevant to water resources and their efficient use. The Center also conducts special studies for the Massachusetts Water Resources Commission under a yearly grant program.

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

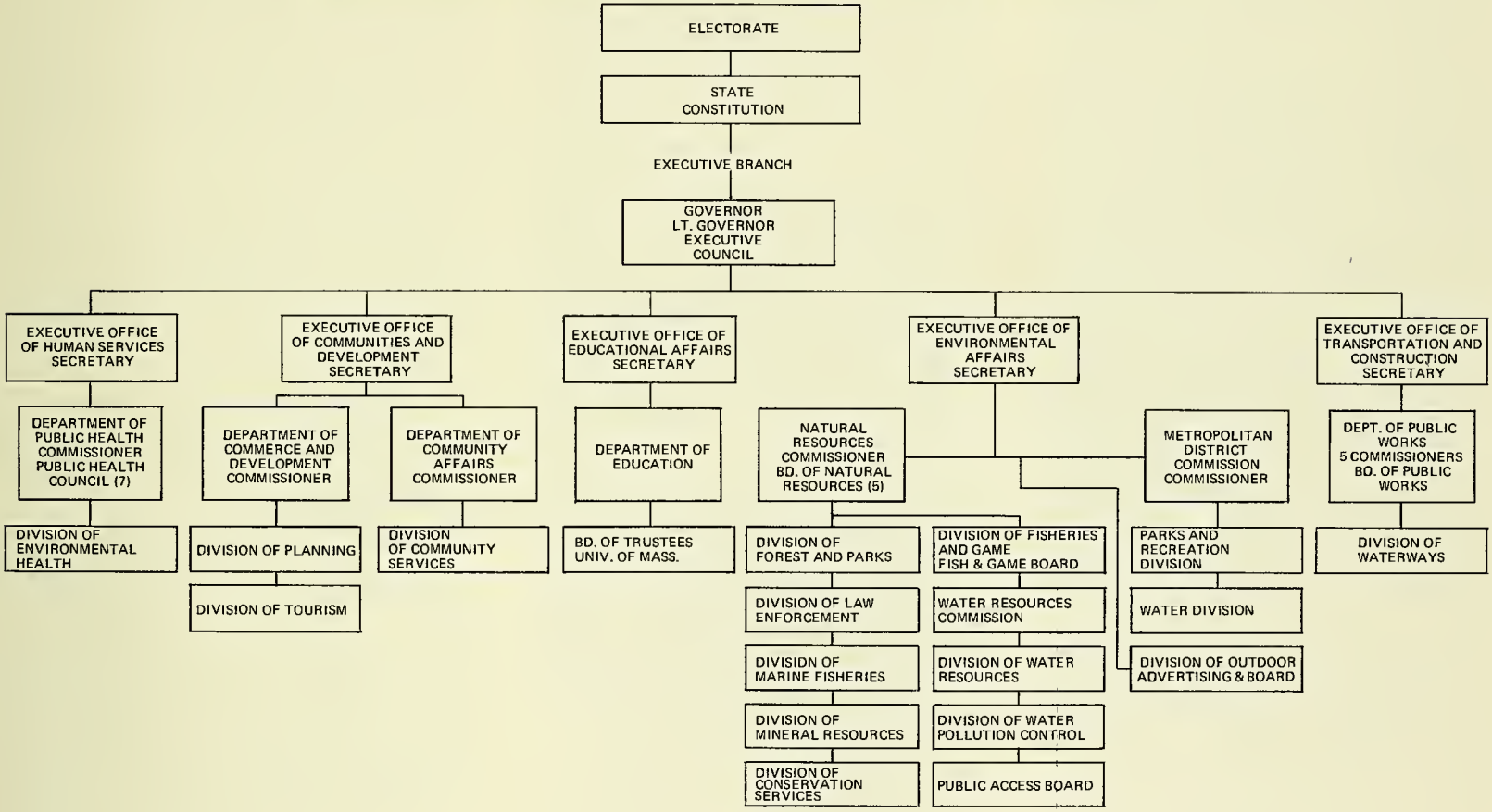
The Executive Office of Environmental Affairs operates to protect the state's natural resources and to provide a healthy environment for the public through planned growth and development.

Department of Natural Resources

The Department of Natural Resources protects, controls and develops the natural resources of the Commonwealth through research, planning and implementation of action programs aimed at the preservation of our land and water resources. Six divisions are involved in providing outdoor recreation facilities and open space areas for the Commonwealth (see figure IV-1).

Division of Conservation Services functions to conserve the renewable natural resources of Massachusetts through programs and cooperative efforts with federal, state, county, local and private agencies. The Division administers the Self-Help Program which provides up to 50% reimbursement to conservation commissions for acquisition of conservation and outdoor recreation lands. The Division administers inland and coastal wetlands

MASSACHUSETTS STATE GOVERNMENT SHOWING SECRETARIATS, DEPARTMENTS AND DIVISIONS HAVING SIGNIFICANT FUNCTIONS IN RECREATION, 1971


ELECTORATE
STATE CONSTITUTION
EXECUTIVE BRANCH
GOVERNOR LT. GOVERNOR EXECUTIVE COUNCIL
EXECUTIVE OFFICE OF HUMAN SERVICES SECRETARY
DEPARTMENT OF PUBLIC HEALTH COMMISSIONER PUBLIC HEALTH COUNCIL (7)
DIVISION OF ENVIRONMENTAL HEALTH
EXECUTIVE OFFICE OF COMMUNITIES AND DEVELOPMENT SECRETARY
DEPARTMENT OF COMMERCE AND DEVELOPMENT COMMISSIONER
DIVISION OF PLANNING
DIVISION OF TOURISM
DEPARTMENT OF COMMUNITY AFFAIRS COMMISSIONER
DIVISION OF COMMUNITY SERVICES
EXECUTIVE OFFICE OF EDUCATIONAL AFFAIRS SECRETARY
DEPARTMENT OF EDUCATION
BD. OF TRUSTEES UNIV. OF MASS.
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS SECRETARY
NATURAL RESOURCES COMMISSIONER BD. OF NATURAL RESOURCES (5)
DIVISION OF FOREST AND PARKS
DIVISION OF LAW ENFORCEMENT
DIVISIDN OF MARINE FISHERIES
DIVISION OF MINERAL RESOURCES
DIVISION OF CONSERVATION SERVICES
DIVISION OF FISHERIES AND GAME FISH & GAME BOARD
WATER RESOURCES COMMISSION
DIVISION OF WATER RESOURCES
DIVISION OF WATER POLLUTION CONTROL
PUBLIC ACCESS BOARD
METROPOLITAN DISTRICT COMMISSION COMMISSIONER
PARKS AND RECREATION DIVISION
WATER DIVISION
DIVISION OF OUTDOOR ADVERTISING & BOARD
EXECUTIVE OFFICE OF TRANSPORTATION AND CONSTRUCTION SECRETARY
DEPT. OF PUBLIC WORKS 5 COMMISSIONERS BD. OF PUBLIC WORKS
DIVISION OF WATERWAYS

legislation; coordinates and administers the Land and Water Conservation Fund Act in Massachusetts (see federal section - BOR); and works with the U.S. Army Corps of Engineers and the U.S. Soil Conservation Service. The Statewide Planning Unit within the Division is responsible for the State Comprehensive Outdoor Recreation Planning Program.

Division of Fisheries and Game, under the Department of Natural Resources but supervised by the Fisheries and Game Board, manages fish and wildlife resources and the environment that supports them, administers licensing programs, engages in research, disseminates information, conducts information programs, and promulgates laws and regulations. The Division owns and controls approximately 40,000 acres of land and water, including state fish hatcheries, game farms, boat launching facilities, wildlife sanctuaries and wildlife management areas. On these lands and facilities the Division provides for outdoor recreation uses which are consistent with sound fish wildlife management. Fish and wildlife programs are aimed at improving recreational opportunities through two methods: 1) acquisition and development of new public areas, and 2) alteration, development, and improvement of existing public facilities. A concurrent but equally important program extends technical and advisory services to private and community interests.

Division of Forests and Parks manages approximately 280,000 acres of land and water, including all state forests, parks and reservations and all state operated ocean beaches, swimming pools and skating rinks outside the Metropolitan District Commission area. These areas provide a wide variety of recreational opportunities. The Division also furnishes technical aid in natural resource planning and exchanges technical assistance and information with the U.S. Forest Service, the U.S. Soil Conservation Service and the U.S. Army Corps of Engineers.

Division of Marine Fisheries is responsible for the protection and development of marine resources in the state's coastal waters. It supervices recreational saltwater fishing, administers all laws relating to marine fisheries, and initiates control procedures against pollution and unauthorized dredging and filling in coastal waters and wetlands. The Division receives research funds from the Department of Commerce, National Marine Fisheries Service (P.L. 88-309, P.L. 89-304 - Sea Grant), from the Department of Interior, Bureau of Sport Fisheries and Wildlife (P.L. 89-304) and from private grants.

Public Access Board, consisting of five members - the Commissioners of Natural Resources, Metropolitan District Commission, Public Works, and the Directors of Fisheries and Game and the Division of Motorboats of the Registry of Motor Vehicles - considers and designates points of recreational access to the waters of Massachusetts and arranges for construction of approach roads, parking areas and launching ramps.

Division of Water Resources, in the Department of Natural Resources but under the direction of the Water Resources Commission (WRC), coordinates all water and land-related resource activities of state, interstate and federal agencies with special concern for water resource policy formation based on agricultural, industrial, recreation, wildlife, conservation and flood protection interests. It supervises programs provided by the Watershed Protection and Flood Prevention Act (P.L. 566). It is also responsible for guiding other programs of the U.S. Army Corps of Engineers, U.S. Soil Conservation Service, and the Water Resources Council.

Division of Water Pollution Control, also in DNR and supervised by the Water Resources Commission, enhances the quality and value of inland and coastal water resources in the Commonwealth through a program for prevention, control and abatement of water pollution. The Division administers two bond issues totaling $400,000,000 to provide state assistance for the construction of municipal and regional sewage treatment facilities. The Division works with the U. S. Environmental Protection Agency (EPA) and reviews and endorses applications for federal grants and loans under HUD. In addition the Water Resources Commission owns and operates about 4,000 acres of land in Massachusetts for flood control purposes and associated recreational use.

Division of Mineral Resources regulates leasing and licensing for the responsible exploration and extraction of mineral deposits beneath Massachusetts' coastal waters. The Division's responsibility includes determining the feasibility of making removals without upsetting the ecological balance within the marine environment or impairing recreational activities such as fishing and swimming.

Metropolitan District Commission

Three divisions of the Metropolitan District Commission (MDC) are directly involved in outdoor recreation facilities or programs.

Parks Division provides a park system in the Boston metropolitan area. It acquires, administers, protects and manages park and recreation areas, including facilities for boating, swimming and skating, as well as a system of roadways, parkways and boulevards for access to reservations. Blue Hills Reservation in Milton, covering over 5,000 acres, is the largest MDC operated reservation. Ten parkways, two highways, ten beaches, as well as various other properties including Bunker Hill Monument, the Franklin Park Zoo and two major golf courses, are also under MDC supervision.

Water Division provides an extensive water supply system. It also enforces regulations to protect water resource quality in all Metropolitan Water District communities. Quabbin Reservoir in the Connecticut River watershed, and Wachusett Reservoir in the Central Highlands, are the largest

areas operated by the Water Division and both provide public recreational facilities.

Sport Fishing Division controls a series of small ponds which provide fishing opportunities in metropolitan Boston. In cooperation with DNR's Division of Fisheries and Game, fishing is supplemented by a stocking program. The Sport Fishing Division also sponsors fishing clinics for youngsters and hopes also to include senior citizens in the program.

EXECUTIVE OFFICE OF HUMAN SERVICES

The Executive Office of Human Services helps to meet the needs of individual citizens for counseling, training, personal health, rehabilitation and income supplementation.

Department of Public Health

Division of Environmental Helath promotes public health, safety and enjoyment by providing safe and suitable waters for human consumption and recreational use. The Division has a close liaison with the U.S. Department of Health, Education and Welfare, the U.S. Army Corps of Engineers, the U.S. Geological Survey, the U.S. Soil Conservation Service, the U.S. Department of Housing and Urban Development and the Federal Water Pollution Control Administration.

EXECUTIVE OFFICE OF TRANSPORTATION AND CONSTRUCTION

The Executive Office of Transportation and Construction provides plans and policies to establish a balanced and efficient transportation system and to construct and maintain this transportation system as well as maintain state buildings.

Department of Public Works

The Department of Public Works designs, constructs and maintains the state highway system. It assists in all types of transportation planning at all levels - local, regional, state and federal. The Department is charged with the protection of great ponds and tidelands against encroachment. In addition, the Department constructs and maintains roadside rest and picnic areas associated with the state highway system.

OTHER STATE AGENCIES

Massachusetts Historical Commission

The Massachusetts Historical Commission, under the jurisdiction of the Secretary of State, was established in 1963. The Commission is responsible for administering the National Historic Preservation Act in Massachusetts by protecting and certifying as landmarks sites of unique historical and cultural significance. Federal acquisition and development funds are filtered through the Commission to localities for preservation and restoration of individual properties.

Municipal Government

Municipal government is responsible for planning and providing facilities designed primarily for the immediate needs of its own residents. Municipal recreation and open space responsibilities lie primarily with recreation and park commissions, board of selectmen, conservation commissions, school departments and water departments which perform the following tasks in providing for the recreational needs of the citizens of the community:

1. acquire land and develop facilities including neighborhood parks, playgrounds, community playfields, and recreation facilities at public school sites.
2. plan and provide recreational programs and services which meet the recreational needs of special groups of residents including the unique requirements of neighborhoods.
3. acquire and protect lands and water resources which have natural or historic significance to the community.

Park and Recreation Commissions, elected by local residents, are responsible for providing and improving park lands for the town and authorizing the acquisition of lands for park and recreation purposes by eminent domain, purchase or gift.

Boards of Selectmen: In a town that does not have a board of park commissioners or in which a town planning board is not acting as such, selectmen are mandated by law to act as the board of park commissioners. Selectmen are also responsible for appointing a special town forest committee to manage the town forests.

Conservation Commissions: A city or town may establish a conservation commission for the promotion and development of natural resources and the protection of watershed resources of a city or town. Towns with conservation commissions may be reimbursed up to 50% of costs for such lands under the Massachusetts Self-Help Act, providing they have an approved open-space and recreation plan.

School Departments provide playground and playfield facilities for student and community use. They also conduct educational and recreational programs for persons of all ages and encourage their involvement in a variety of activities.

Water Departments have a secondary function in outdoor recreation and open space. They are in charge of town water supplies and adjacent lands, and these commitments sometimes include recreational resources. Hydrants and fountains come under the control of municipal water departments and often are used for recreational purposes.

Private Organizations

Private organizations play a significant role in providing a variety of recreation and open space programs and resources throughout the Common-

wealth. Two groups are included, the private profit and private nonprofit or charitable organization.

PRIVATE PROFIT SECTOR

The private profit sector plays a very vital role in providing recreation facilities in Massachusetts. In many areas of the Commonwealth they are the leading supplier of facilities, including hunting, fishing, golf, tennis, swimming, riding and boating. One major private enterprise in Massachusetts is skiing. Forty-two of the 45 ski areas in the state are privately owned and operated.

PRIVATE NONPROFIT ORGANIZATIONS

These groups include the "charitable" and quasi-public organizations such as the Boy Scouts, YMCA, American Legion and local historical societies. They play a major role in outdoor recreation, particularly by involving participants in experiences which teach values of life and appreciation of the environment.

Two organizations which play a special role in preserving natural and historic areas in the Commonwealth are the Massachusetts Audubon Society and the Trustees of Reservations.

Massachusetts Audubon Society is a private, nonprofit conservation agency concerned with the preservation of open-space land and with fostering public awareness of man's need to live in harmony with his environment. The Society owns and manages over 7,000 acres of land in Massachusetts, of which the most extensive preserves are Wachusett Meadows Wildlife Sanctuary in Princeton, the Ipswich River Wildlife Sanctuary, Pleasant Valley Wildlife Sanctuary, and the Wellfleet Wildlife Sanctuary. Further functions of the Audubon Society include research, conservation education, summer day camps and the publication of various articles and magazines.

The Trustees of Reservations, a charitable corporation founded for conservation purposes, was created in 1891 to preserve for the public places of natural beauty and historic interest within the Commonwealth of Massachusetts. It is a privately administered, nonprofit organization which operates statewide. It relies for support entirely on voluntary subscriptions, income from endowments and limited admission fees.

The Trustees of Reservations is custodian for 53 open space and historic areas totaling about 11,500 acres. Three of its houses, the Old Manse in Concord, the Bryant Homestead in Cummington, and the Mission House in Stockbridge, are National Historic Landmarks. One, Bartholomew's Cobble Reservation in Ashley Falls, is a National Natural Landmark. Other properties preserved for scenic, scientific, historic, educational and recreational purposes by the Trustees of Reservations are Crane's Beach and Castle Hill in Ipswich, World's End in Hingham, and Lowell Holly Reservation in Mashpee.

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STUDIES AND METHODS

This chapter presents the inventory and analysis methods used to determine recreation needs in the Commonwealth and includes appropriate supporting material from previous national and state studies.

Separate sections are included on the following topics: 1) outdoor recreation inventory, 2) use of the computer, 3) demand, 4) density groups, 5) demand projection methodology and 6) analysis of needs.

Outdoor Recreation Inventory

An outdoor recreation and open space inventory was conducted during 1970 to measure existing and potential supply of outdoor recreation opportunities in the Commonwealth. Major objectives of the inventory were: 1) to update the 1966 inventory and expand previous inventories to include private and municipal sites, 2) to inventory potential recreation sites that are essentially undeveloped open spaces of 50 acres or more, and 3) to establish a computerized inventory system that can be continually updated. In total over 9,000 existing and potential recreation sites were identified and inventoried.

The inventory was designed to cover a wide range of sites and activities. Four ownership categories were inventoried: 1) federal, 2) state (including regional and county), 3) municipal and 4) quasi-public and private. In addition to lands used solely for recreational purposes, open-space lands held by clubs, private schools, land trusts and various educational, religious and health institutions were identified. For each activity covered, the number of units available at each location, such as picnic tables or campsites, was also given. In addition several specific questions were asked concerning the availability and accessibility of the sites and future potential of the area. For a detailed listing of the site categories included, activities covered and questions asked, see Appendix A.

Inventory data was collected and tabulated by the Division of Conservation Services Planning Staff in cooperation with the staffs of other Department of Natural Resources divisions, field personnel of the Department's Division of Forests and Parks, and federal, state, municipal and private agencies.

The inventory form and information gathering techniques were tested in the Eastern Massachusetts Planning Region and subsequently applied to the remaining six regions.

Use of the Computer

In addition to identifying existing and potential recreation sites and facilities, another major objective of the inventory study was to establish an inventory system that can be continually updated. Therefore, from the inception of the planning project plans were made to handle the inventory information by data processing. Not only would updating be more easily accomplished through a computerized system, but hand tabulation of the tremendous amount and variety of data from the state's 351 municipalities was simply unfeasible. The inventory form and the computer programs were designed so that new recreational sites can be added to the inventory list and previously inventoried sites can be updated to incorporate new acquisitions and facilities as they occur.

Two methods of securing computer facilities were considered: 1) the consultant approach, whereby a private computer service would be hired to do all the programming and processing; and 2) the in-house approach, whereby available state computer facilities would be utilized. The in-house approach was adopted, based on the premise that utilization of state personnel and resources would result in a considerable saving, better in-house understanding and control of the inventory program and information, and a more effective updating procedure.

No single state agency could provide the necessary range of computer services - programming, manpower, key punch equipment or computer facilities. As a result, various segments of the job were portioned out to three different groups at three different locations. The Department of Correction offered the programming services of inmates at the Massachusetts Correctional Institution at Norfolk and the coding and key punching services of women inmates at the Massachusetts Correctional Institution at Framingham. Both groups were participating in a computer training program at the time. Program and inventory data were compiled and tested on the computer facilities of the Research Division of the Department of Education in Woburn.

In addition to time-consuming logistical difficulties, other problems were encountered: insufficient computer time when needed to check program and print out data; programming errors requiring time-consuming "debugging" work; and loss of the coding and key punching services of Framingham in the early stages of the inventory. During the three years of the inventory project the interagency arrangement failed twice: first, when the coding and key punching services were cancelled, and, second, when the computer itself was not available due to the demand of higher priorities within the Education Department - making it necessary to arrange with private contractors to complete the work.

Currently not all of the information gathered during the inventory phase has been made available. In actuality only about one-half of the supply information needed to present a complete picture for the Outdoor Recreation Plan has been tabulated.

On the positive side much has been learned to guide future efforts. During the continuing planning program emphasis will be placed on improving the

computer program and the rest of the inventory information will be tabulated and improved through a regular update of the information. In addition, the capability will be developed to cross-tabulate the supply and demand data.

The initial commitment to the in-house approach, although only partially successful for the present inventory, is still considered the best approach to dealing with the problems of long-range planning. The State has extensive computer capability and equipment. Efforts are now under way to coordinate the use of these facilities and to provide a staff to program and operate them. If an interagency arrangement can be formalized to guarantee the use of these facilities, the inventory's recent difficulties need not be repeated in the future.

Demand

The purpose of this section is to outline the steps used in estimating current and projected demand for outdoor recreation in the Commonwealth and to present an overview of the supporting studies and materials used in developing the projections. It should be pointed out that because of many social, economic and technical factors which have an impact on recreational participation rates, demand figures are at best only approximations of the actual situation.

No easy method has been devised for determining what people will do with their leisure time. It is reasonable to assume, however, that there will be more people, increased leisure time, higher incomes and higher educational levels. On the other hand, the nation's financial and natural resources available for acquisition and development will probably continue to be limited.

NATIONAL PARTICIPATION TRENDS

Information for this subsection has been primarily drawn from the Outdoor Recreation Resources Review Commission study (ORRRC) and a subsequent 1965 study by the Bureau of Outdoor Recreation (BOR).

It is estimated that by 2000 the nation's population will double and that greater numbers of people will be participating in outdoor recreation, although the actual percentage increase will vary by activity. The ORRRC study found that demand for outdoor recreation is accelerating at a faster rate than the population growth. For instance, between 1952 and 1962 visits to state parks increased by 113% while the nation's population rose by only 20%. The BOR study revealed that between 1960 and 1965 participation in the 16 major summertime activities increased by 51%. Projections for the same 16 activities, when compared with 1960, indicate a participation increase of 250% by 2000.

In 1970 the four most popular activities participated in, listed in descending order, were driving for pleasure, swimming, walking, and participant games (see figure V-1). It is projected that the four activities will hold their rank order through 1985, but by 2000 swimming will be the number one activity and participant sports will replace walking as the third most popular activity.

Although the total number of participation occasions is small as compared to the projections for the four most popular activities, the percentage increase projected for sightseeing, picnicking, spectator games, boating, camping, water skiing and hiking is very large.

Not only do those who currently participate in these activities generally want to participate more, but many who do not now participate would like to do so in the future (see figure V-2). This desire for more participation is even greater in some of the currently less popular activities, most notably fishing, boating, camping and horseback riding.

Most of the activities showing present and anticipated popularity are water based or water oriented. In addition to swimming, water skiing, fishing and boating, which are directly dependent on the quality and quantity of the available water supply, other activities such as picnicking, camping, sightseeing, pleasure driving and walking are often enhanced by the presence of attractive water areas.

Massachusetts can anticipate participation patterns similar to the rest of the nation. A survey of state park and forest users revealed that the activities most participated in at these areas were picnicking, swimming, sightseeing, pleasure driving and walking.

URBAN GROWTH AND RECREATION TRAVEL

Two separate recreational travel patterns are developing: for day use, shorter trips are becoming more popular; for vacation trips, places farther from home are increasingly desired. This trend is due largely to national patterns of urban development. These patterns have been influenced by two factors: the population explosion, a frightening acceleration in the nation's and the world's rate of population growth, and the population implosion or urbanization, an increasing concentration of people on relatively small areas of the earth's surface.

Although the United States became an urban nation only as recently as 1920, by 1970 seventy percent of the population resided in urban areas. In these heavily populated areas the demand for most types of outdoor recreation is greatest, centering primarily on day-use activities in which people can participate after work or on weekends. Resources to satisfy these needs within metropolitan areas are generally limited. Large urban centers and their suburbs tend to have the fewest recreation facilities per capita and the highest land costs. Very often their water and land resources are in poor condition.

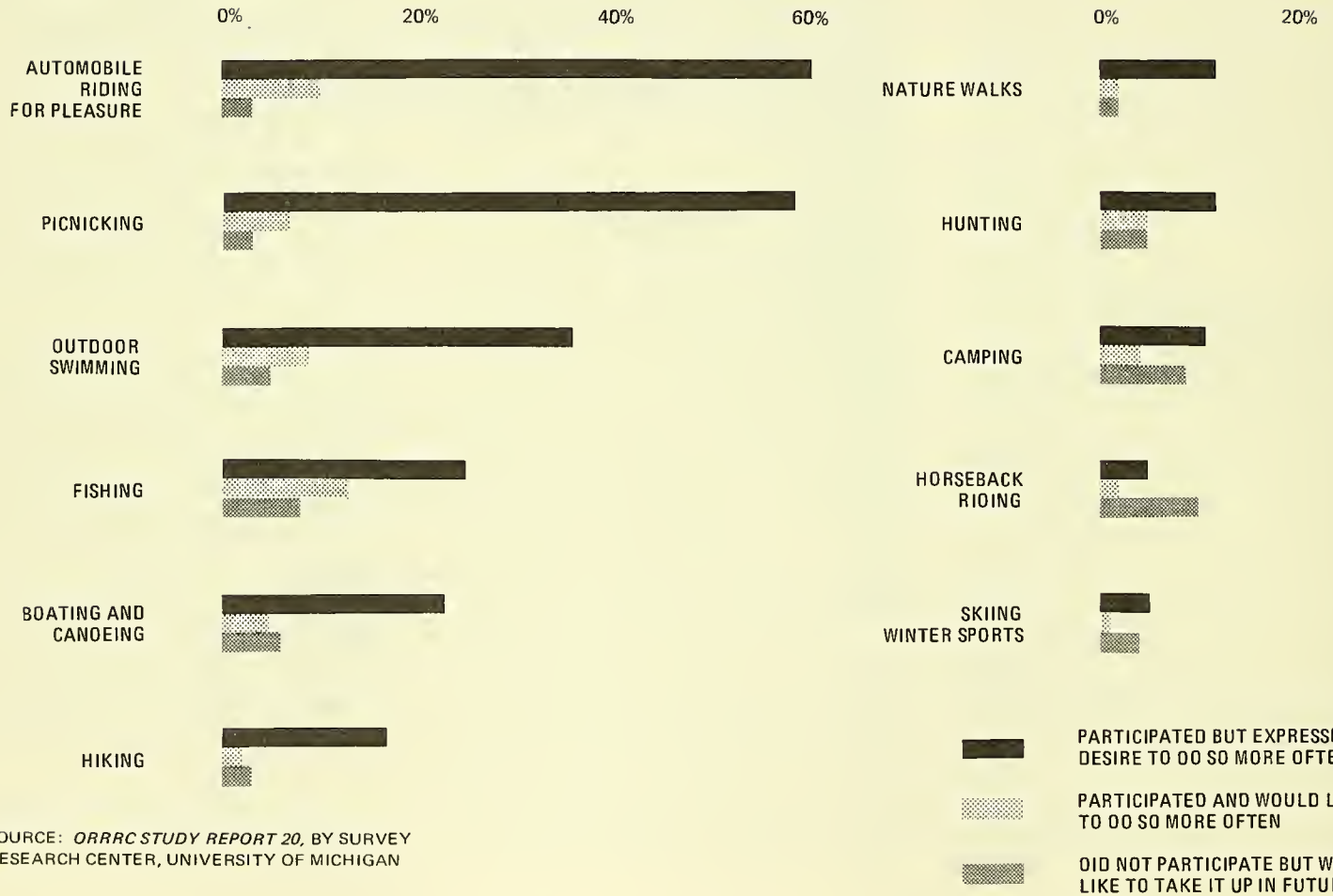
Figure V-1

MILLIONS OF OCCASIONS OF PARTICIPATION

SOURCE:
U.S. DEPARTMENT OF THE INTERIOR/BUREAU OF OUTDOOR RECREATION
OUTDOOR RECREATION TRENDS – GOVERNMENT PRINTING OFFICE. 1967– P20–21

Figure V-2

EXPRESSION OF PREFERENCE OF PARTICIPANTS AND NON-PARTICIPANTS IN OUTDOOR ACTIVITIES



SOURCE: *ORRRC STUDY REPORT 20,* BY SURVEY RESEARCH CENTER, UNIVERSITY OF MICHIGAN

Less developed and less densely populated areas, located at some distance from urban areas, must help provide the resources to meet urban demands especially demands for vacation trips and outings. The accessibility of these resources to high-density population areas may improve considerably in the next 15 to 30 years because of higher incomes, longer vacations, longer (3-day) weekends, and the completion of the interstate highway system.

Approximately 50% of Massachusetts residents live in the Boston Standard Metropolitan Statistical Area (SMSA). In 1970 nearly 85% of the state's population lived in SMSA's, or urban areas as defined by the U.S. Census Bureau. This urban concentration represented no significant change from the 1960 census.

Day-use demand should be satisfied close to home, generally within an hour's traveling time. Participation away from home - on extended day trips, outings and vacations - generally draws people from the eastern section of the state to the Connecticut Valley, the Berkshires, and Cape Cod, although many Massachusetts residents recreate in Maine, New Hampshire and Vermont. Among the major recreation areas of the state are large state forests, parks, ocean beaches and open spaces utilized by both residents and nonresidents. In many instances these areas provide the Commonwealth's urban dwellers with their only taste of outdoor living aside from the patio cookout.

OUT-OF-STATE VISITORS

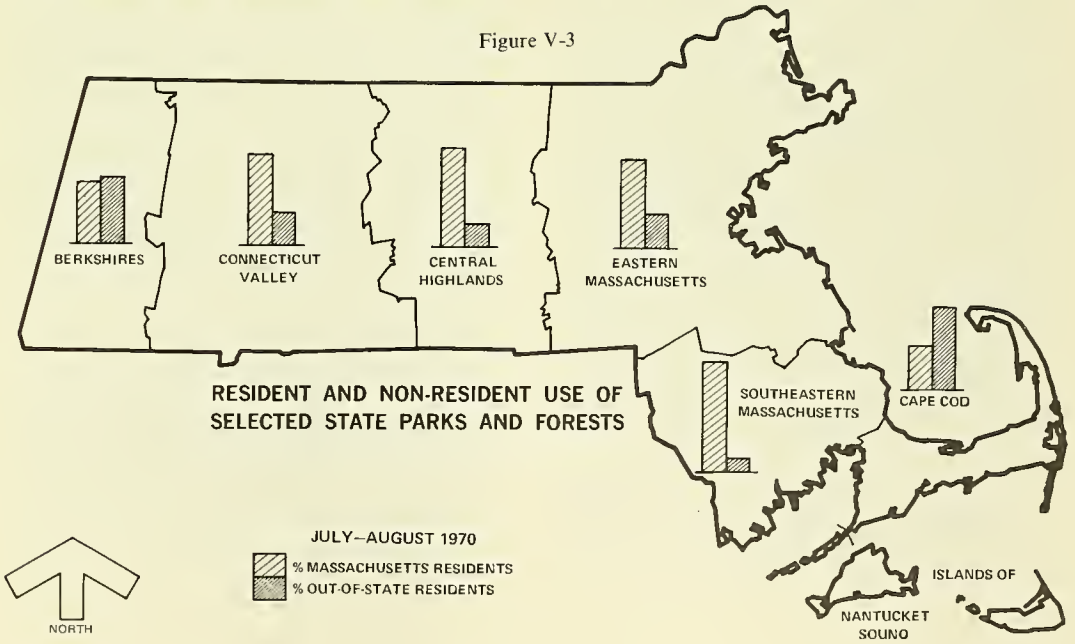
One indication of the rapid increase in recreation demand is the growth in Massachusetts' recreation-tourism business. Between 1958 and 1966 employment increased 26% in recreation-tourism businesses (those covered by unemployment insurance), while total nonmanufacturing employment increased 22% and total employment, including manufacturing, grew only 13%.

In comparison with other New England states Massachusetts has fallen behind Vermont and New Hampshire in per capita tourism receipts. A 1970 study of Massachusetts tourism concluded that the Commonwealth is an "exporter" of tourism; that is, Massachusetts residents spend more tourist dollars outside the state than nonresidents spend in the state. In New England, Vermont, New Hampshire and Maine were importers of tourist dollars while Rhode Island and Connecticut followed Massachusetts as exporters of tourist dollars.

However, in the Commonwealth, certain areas - Cape Code, the Islands of Nantucket Sound and the Berkshires - experience heavy nonresident recreational demand. A 1970 summer survey at state forests and parks showed that on Cape Cod and in the Berkshires more nonresidents than residents visited these facilities (see figure V-3). In the Berkshires nonresidents slightly outnumbered resident visitors, while on the Cape nonresidents outnumbered residents by more than two to one. Some of this heavy nonresident demand also appears on the Islands.

Out-of-state visitors represented 26% of those interviewed during the survey. When one applies this same percentage to total state forest and park attendance (2,680,018 during fiscal 1970), it is projected that about 700,000 park users were from out of state. Of this number the eastern states most often represented were New York (9%), Connecticut (5%), Rhode Island (2%) and New Jersey (2%). Residents of each of the three northern New England states - Maine, New Hampshire and Vermont - made up less than 1% of the visitors.

Figure V-3



ATTENDANCE AT EXISTING RECREATIONAL FACILITIES

Another indication of the increase in recreation demand is the attendance records at existing recreational facilities. With the exception of areas undergoing construction and development or experiencing temporary local problems such as bad weather, algal growth in ponds or unsightly tree damage by insect defoliators, attendance at public recreational facilities has increased substantially during the past ten years.

In 1960, 40 state forest and park facilities reported attendance totaling nearly 1.5 million. By 1971 attendance had increased by over 125% to a total of 3.4 million at 47 facilities. With new and expanded facilities major increases in attendance can be expected to continue in the coming years.

BOSTON AREA STUDY

In 1970 the Boston Area Study (BAS) was conducted by the Harvard-MIT Joint Center for Urban Studies. Selected households in the Boston metropolitan area (SMSA) were asked a variety of questions about medical services, health care, residential mobility and housing, changing family size and recreation and leisure time. The recreation and leisure questions prepared by the Department of Natural Resources were designed to measure 1) preference for and participation and interest in selected outdoor recreation activities and 2) use of leisure time, both on vacation and nonvacation.

Emphasis in analyzing the BAS data has been placed on the influence of certain socioeconomic characteristics on interest and hence potential participation in recreational activities. Findings indicate that in general:

1. Interest in outdoor recreation is strongest among people under 40 years of age and decreases with advancing age.
2. Interest in outdoor recreation increases as the level of education attained increases.
3. Interest in outdoor recreation increases as total family income increases.
4. Families with minor children show a slightly higher level of interest in outdoor recreation than families without minor children.
5. Although the suburbanite tends to be slightly more interested in most recreational activities than urban dwellers, the difference is not significant.

In summary, then, interest in outdoor recreation is highest among the younger, better educated people who have higher incomes and minor children.

Density Groups

The existence of various types of recreational facilities in a region does not necessarily indicate that they are easily accessible to the public. To examine the relationship between facilities and population, each planning region was divided into groups of towns having a similar level of population density or number of people per square mile. Five classifications were chosen: extremely dense (10,000 and above persons per square mile), very dense (3,000 - 9,999), dense (800 - 2,999), less dense (200 - 799) and open (up to 199). Following this step all subsequent analyses of supply, demand and need for outdoor recreation areas and facilities in a planning region were delineated by density groups.

Demand Projection Methodology

The following section describes the method used for projecting demand for swimming, camping, boating and picnicking. Emphasis has been placed on these four activities for the following reasons:

1. Based on information supplied by the 1970 Outdoor Recreation and Open Space Inventory, these are the activities most readily quantifiable.
2. They are activities in which state resources play an important role in satisfying public demand.

PARTICIPATION RATES - SWIMMING

The Boston Area Study collected information on swimming participation by the interviewees and their families. However, the participation determined from this question reflects family rather than individual rates, since, if the person interviewed had gone swimming on a given day with his four children, this appeared as one swimming occasion rather than five. Thus the participation rates are low, but for planning purposes it has been assumed that they will suffice as a basis for developing a supply-demand-need analysis for swimming in Massachusetts. A second important assumption made in order to develop statewide and regional swimming participation rates is that the rates identified for the Boston SMSA, which includes approximately 50% of the state's population, can be applied with modifications to other regions of the state. In order to do this the population of each region and the total state was studied to determine differences in age, income, density and education levels.

When participation rates were calculated only age and income variations were used because, as previously stated, there is little difference between urban and suburban participation rates, and although education has an effect on participation, it has been safely assumed that there is a strong linkage between income and education.

PARTICIPATION RATES - BOATING, CAMPING, PICNICKING

The Boston Area Study did not include sufficient references to boating, camping and picnicking to provide participation rates for each activity in the same manner determined for swimming. Therefore, as a basis for establishing an estimate of these rates, a comparison was made between the 1970 Boston Area Study swimming participation rates for Massachusetts and participation rates shown for

these activities in New England in the 1965 BOR Trends Study. This analysis showed that swimming participation in Massachusetts in 1970 was much higher than that projected for New England and the nation. A comparison of the 1965 national rates and the 1970 Massachusetts rates, including consideration of income levels, indicated the percent difference in the two figures. This difference was assumed to be uniform for other activities and was used to develop picnicking, camping and boating participation rates.

DEMAND PROJECTIONS - 1970

The participation rates were applied to the 1970 resident population for each of the planning regions, giving appropriate weight to the age and income factors. In addition, the projected demand for the Berkshires, Cape Cod and the Islands of Nantucket Sound Regions was increased by an appropriate factor to account for nonresident demand. This approach was adopted because the state forest and park user-demand survey, substantiated by information from other studies, indicated heavy nonresident demand in each of these areas. Thus in the Berkshires the resident population was doubled, on the Cape tripled, and on the Islands increased one and one-half times.

MEASUREMENT OF FACILITIES

The Outdoor Recreation and Open Space Inventory collected information on the availability of 54 separate activities. The number of sites offering these activities, and the number of units or dimensions of the facilities were also included. Since detailed analysis of each of the 54 specified activities was not considered possible within the scope and purpose of the 1971 Outdoor Recreation Plan, four critical activities - swimming, picnicking, camping, and boating - were selected, as previously noted, for detailed examination.

The number of units and the number of sites where each activity is available were converted into seasonal and annual occasions in order to determine the number of persons who would be able to satisfy their recreation demand at existing facilities. The methodology used to derive total annual activity days (an annual activity day is defined as one person participating in a given activity for part or all of one day) for each of the four activities is included in Appendix B.

Analysis of Needs

In the 1971 Outdoor Recreation Plan the determination of need was based on a comparison of supply and demand data for each activity. The existing supply of facilities was converted into annual user capacity for each region and these figures were compared with the regional demand in activity days for each activity. It is assumed that the difference between supply and demand represents either a surplus or deficit of annual available activity days for each activity in each region.

At this stage in the information and planning process in Massachusetts it was not possible to convert activity days into facilities or acres of land and water because insufficient research has been conducted on the standards needed to make this conversion. Consequently, needs have been expressed in terms of unsatisfied annual activity days.

The location of the needed facilities, their size and the amount of land and water resources which would be consumed in providing these facilities are not discussed in this report for the following reasons: 1) If the needs for swimming, picnicking, camping, and boating (identified in the present study) were converted by generally accepted standards into facilities and acres, an unrealistically large proportion of the Commonwealth's land and water area would have to be reserved for these four activities; 2) an exclusively recreation-oriented approach makes no allowance for residential, business, industrial and other land-use requirements of the state's residents; and 3) a critical shortage of available land suggests the need to explore new possibilities, such as use of highway interchanges, median strips, rooftops and parking lots, to provide recreational resources.

RECREATION STANDARDS

Open space and facility standards must be continually updated to keep pace with the changing times. Changes in socioeconomic factors, trends and patterns in recreation, quantity and quality of existing facilities and other factors are essential considerations if standards are to be both realistic and relevant to the public's recreation needs. In Massachusetts standards must reflect the state's special character - the location of population concentrations, historic, ethnic and cultural traditions, natural conditions such as soils, slope, etc.

Studies undertaken as part of the 1971 Outdoor Recreation Plan provide only a small portion of the information needed to determine standards for Massachusetts. The Inventory of Open Space and Outdoor Recreation sites and facilities has produced estimates of gross land and water acreage currently used for outdoor recreation. A comparison of these data with population figures provides only general guides for assessing the adequacy of present recreation resources. While the Boston Area Study gives some indication of the recreation patterns of the residents of that area, much more information is needed on the basic recreation needs of people and the number, character and location of lands and facilities required to meet these needs.

A major factor which must be considered is the usability of a recreational facility in terms of accessibility to the population group being served. Of course it is very difficult to determine what a reasonable travel distance is. For example, if a

resident in a densely settled urban area must rely on public transportation, his travel radius to available resources may be very limited. Especially for the elderly or the handicapped who have difficulty walking short distances, a park located five blocks away might be inaccessible. This factor has not been given the consideration in this Plan which it deserves but future studies are planned which address themselves to this problem.

Another problem of standards is determining how many people can comfortably be accommodated at a facility, such as a swimming pool, or how much land should be allocated for each campsite or picnic table. It is hypothesized that acceptable standards for a number of urban facilities may vary considerably from standards in suburban or rural areas. Adequate studies on this subject are not currently available and thus the problem requires further study. In conjunction with this the carrying capacity of the land or water must be considered. How many people per unit of land or water can be accommodated without significantly impairing the resource on which this activity is based?

Related to the problem of setting standards is the need for more efficient use of facilities. Facilities must be developed close to the source of demand and greater use must be made of them through such means as lighting for evening use, multiple use of facilities (i.e., flooding parking lots for ice skating), and lengthening the available season. This latter effort is important in Massachusetts because of the shortness of the summer season for such outdoor activities as swimming, picnicking, camping and boating. Swimming, especially, would have greatly expanded resources if existing facilities could be covered for year-round use; in fact, the season could be more than tripled.

Although the 1971 Outdoor Recreation Plan has utilized various standards to provide a measure of the annual capacity of available facilities (many of the standards were based on experience at the state's recreational areas), the Plan recommends extensive study of the adequacy of these standards for Massachusetts. Thus, recommendations for implementation of the 1971 Plan cannot include at this time any detailed listing of such standards. One of the most important aspects of the continuing planning process will be the development of these standards for all types of recreation facilities and for all levels of government and the private sector.

DEMAND-NEED PROJECTIONS 1985-2000

In order to project 1970 facilities needs to 1985 and 2000, it was necessary to make projections of the total population for each of these time periods. For this calculation both state and regional population projections were needed. The best available projections were those of the U.S. Bureau of the Census since no state agency has attempted to prepare definitive state or regional projections. The Department of Natural Resources, fully cognizant of past hazards and pitfalls involving making such projections, has arrived at estimates of future regional population that can serve as indications of trends for planning purposes only.

To arrive at population estimates, the following procedure was used:

1. The 1970 state population was used as the basis for projections.
2. It was assumed that the state's average annual growth rate of 0.7%, including the effect of birth rate and migration, would continue in the next decade. This growth rate is lower than that forecast by the U.S. Bureau of the Census for Massachusetts, but it may actually be higher than the state's future growth if recent trends continue. Thus it was felt that assuming a continuation of the recent level of growth represented a reasonable basis for projections.
3. It was also assumed that the distribution of the state's population among the regions would continue along present trends. The patterns of increase and decrease in population evident during the 1950-1970 period, slight through they have been in some cases, are projected to continue to 1985 and 2000.
4. Based on these assumptions, the state population for 1985 and 2000 was determined by compounding the 1970 population at the rate of 0.7% annually to arrive at the total population for the next 15-30 years. The figures thus arrived at were then distributed among the regions and density groups.

In addition to population projections, it was also assumed that other factors should be considered: expansion of vacation and weekend leisure time, greater flexibility in work and school schedules, improved park planning allowing for more effective use of existing facilities, etc. These and other factors affect not only the total demand but also the the distribution of the demand to include more weekdays, weekends and effective usefulness of existing facilities. It has been assumed that these influences should be taken into account in determining the capacity of the existing supply in 1985 and 2000 as well as the increase in present demand rates of participation for the next 15-30 years.

Since it is difficult to quantify these factors and determine their exact impact on supply and demand, a standard factor has been used to increase both supply and demand and take these influences into consideration; for 1985 both 1970 supply and projected 1985 demand figures were increased by 15%, and for 2000 both the 1985 supply and the 2000 projected demand figures were increased by 30%.

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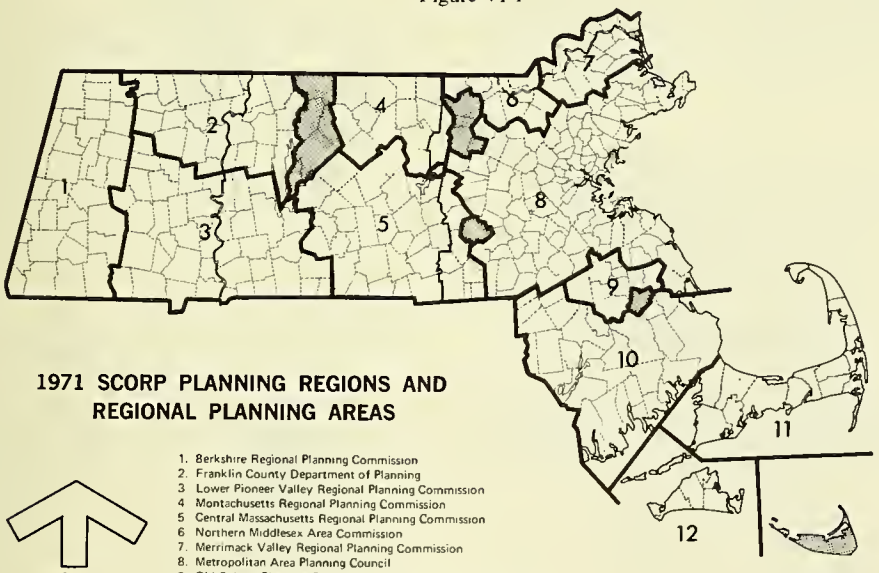
REGIONAL ANALYSIS

In the following chapter general characteristics, recreation resources and outdoor recreation needs are presented for each of the seven SCORP planning regions. In addition, regional open-space and recreation plans, prepared by Massachusetts' 12 regional planning agencies, have been reviewed (see figure VI-1). Major recommendations, if relevant to the framework of the state Plan, have been incorporated in SCORP. Use of these regional plans, which improve the perspective of the relationship between state and local needs, is an initial step in the continuing planning process.

Figure VI-1


1971 SCORP PLANNING REGIONS AND REGIONAL PLANNING AREAS
1. Berkshire Regional Planning Commission
2. Franklin County Department of Planning
3. Lower Pioneer Valley Regional Planning Commission
4. Montachusetts Regional Planning Commission
5. Central Massachusetts Regional Planning Commission
6. Northern Middlesex Area Commission
7. Merrimack Valley Regional Planning Commission
8. Metropolitan Area Planning Council
9. Old Colony Planning Council
10. Southeastern Regional Planning and Economic Development District
11. Cape Cod Planning and Economic Development Commission
12. Dukes County Planning and Economic Development Commission
Unassigned Communities
NORTH

Region I: Berkshire

THE SETTING FOR RECREATION

General Characteristics

The Berkshire Planning Region extends from Vermont in the north to Connecticut in the south; from New York in the west to the western slopes of the Berkshire Hills in the east. The varied and scenic physical setting spans four physiographic subunits. The crest of the Taconic Mountains forms a frontier with New York. Mount Greylock, highest peak in the state (3491 feet), juts up from the surrounding lowlands to link the Taconics with the Hoosac Range of the Berkshire Hills, the southern extension of Vermont's Green Mountains. These three highland elements frame the Berkshire Valley which is sculptured in soft, easily eroded limestone formations. Lowland elevations range from 600 to 1000 feet, while elevations in the Taconics average over 2000 feet with some higher peaks. The Berkshires are somewhat lower with elevations between 1500-1900 feet, although peaks in the Hoosac Range average 2000 feet.

The Hoosic River which flows north and eventually joins the Hudson, and the Housatonic River which flows south through Connecticut are the main streams of the Berkshire Region. To the east, the headwaters of the Deerfield and Westfield rivers make their way through deep gorges to the Connecticut River.

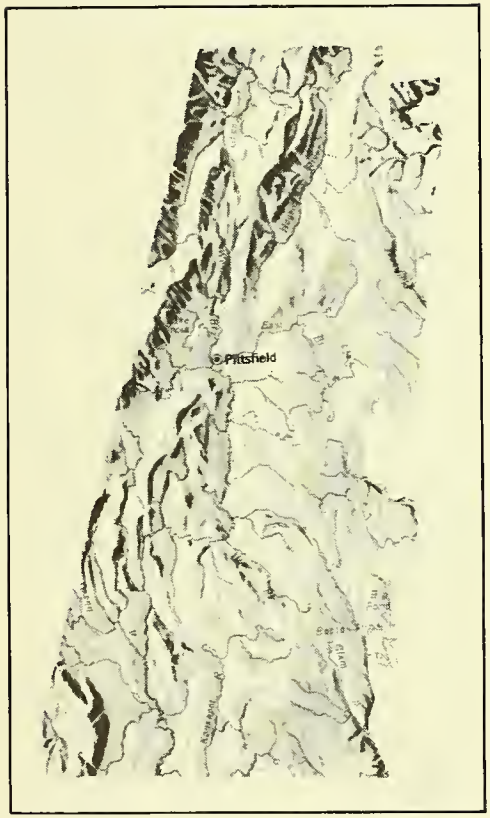
Historically the Berkshire lowland has been the most attractive area of the Region for residential and industrial development. It is here that the largest settlements have grown and persist as the population centers of today. The Region is one of lakes and ponds, mountain vistas or valley scenes, plunging streams and boulder-strewn ravines. The abundance of open land makes Berkshire popular with tourists and recreation seekers.

History and Culture

The Berkshire Hills, originally inhabited by Indians, generally resisted penetration by early settlers who were attracted instead to the fertile Connecticut Valley with its convenient river trade. The territory was purchased from Housatonic Chief Konkapot in 1724 and Sheffield was settled in 1727. The Region grew and was set off from Hampshire County in 1761. Initial industries included cloth dressing and wool carding, followed by iron, potash and leather manufacture. Soon the area was well known for its quarrying which produced limestone for the Washington Monument and

Figure VI-2

RELIEF MAP – BERKSHIRE



the Federal Capitol. Paper manufacture was established in the early 1800's. Today much of the paper produced for U.S. currency is made in the Region. The major employer in the Berkshire Region is the electronics industry.

The Region has become a mecca for artists, writers and musicians. Wealthy families, attracted by the scenic beauty and cultural reputation of the area, established vacation estates. The Berkshire Region is also home to many exclusive boarding schools and specialized summer camps. Best known of the Berkshire events is the annual summer festival at Tanglewood in Lenox. Each year against a backdrop of natural scenic beauty the Boston Symphony Orchestra presents a series of concerts.

Population

With 149,402 people, or 2.6% of the Commonwealth's population and approximately 950 square miles or 12% of the land and water area, Berkshire is fifth in population and fourth in size of the seven SCORP Planning Regions. It has two cities and 30 towns. Mount Washington, with 52 inhabitants, is the smallest town in the Commonwealth.

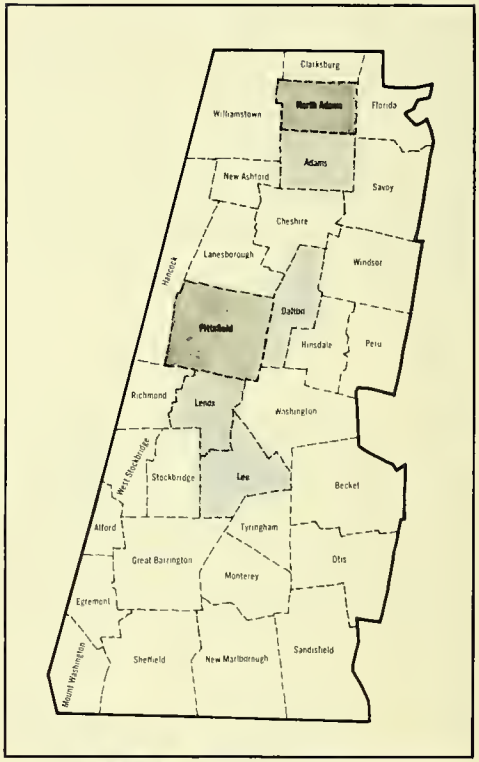
Table VI-1

Population and Land and Water Acres by Density Group, 1970
Berkshire Region

Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	—	—	—
Very Dense		—	—
Dense	80,462	52%	9%
Less Dense	31,507	21%	10%
Open	37,433	27%	81%
Regional Total	149,402	100%	100%

Figure VI-3

POPULATION DENSITY BERKSHIRE 1970



All but six of the Berkshire Region's municipalities are in the sparsely populated, *open* population density category. North Adams and Pittsfield are the only cities in the county. Together they contain more than half the population, thus serving as regional business and employment centers. The remaining four towns are in the *less dense* group (see figure VI-3 and table VI-1).

Transportation

The Berkshire Region is not as well served by public transportation as are the more densely populated regions of the Commonwealth. Some towns are connected to the Region's cities by bus, but service is infrequent. From Pittsfield connections can be made to major cities in the Northeastern United States. Both Boston and New York are about three hours away; Pittsfield also has an airport with scheduled commercial service. The Massachusetts Turnpike, Interstate 90, is the major east-west highway, while U.S. Route 7 serves north-south traffic. The northern part of the Region is crossed by Route 2, the scenic Mohawk Trail, which is popular for fall foliage tours.

Recreation Potential

Rural in nature, Berkshire provides a wide range of recreational opportunities for all seasons. In the spring, and particularly in the fall when foliage turns ablaze, the mountain scenery offers excellent opportunities for pleasure driving and hiking (especially in those areas traversed by the Massachusetts sector of the Appalachian Trail). Among the many scenic spots are Bash Bish Falls, the most spectacular waterfall in the state; Windsor Jambs, a close-walled flume; Bartholomew's Cobble, a geologic and botanic curiosity recently designated a National Natural Landmark; and Mt. Greylock.

In the summer recreation opportunities include not only boating, fishing, hunting and swimming, but also such cultural activities as summer stock and Tanglewood. In the winter mountains and plenty of snow offer opportunities for skiing, ski-touring, snowmobiling and winter camping.

SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open-Space Inventory are shown in figure

Figure VI-4

SELECTED RECREATION LANDS AND SITES BERKSHIRE 1970

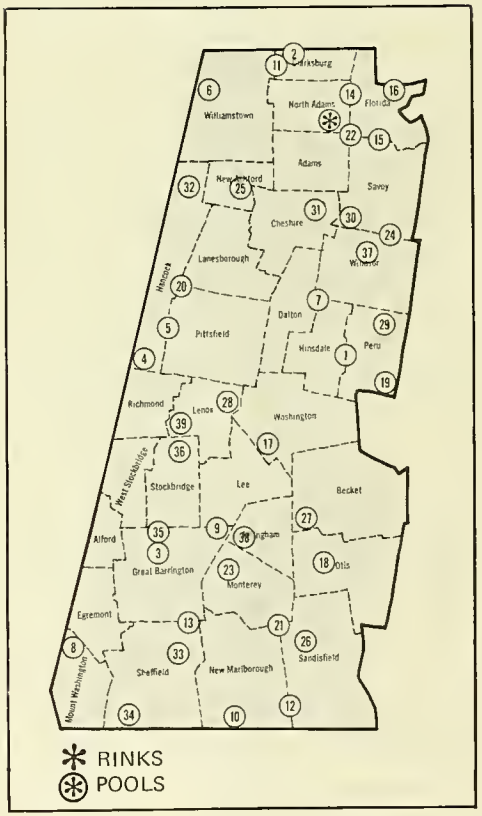


Table VI-2
Existing Recreation Acres by Density Group and Ownership Category,
1970 Berkshire Region

Density Group	Total		Ownership Category							
			Private		Municipal		State		Federal	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	—	—	—	—	—	—	—	—	—	—
Very Dense	—	—	—	—	—	—	—	—	—	—
Dense	6,781	6%	2,011	30%	1,769	21%	3,301	49%	—	—
Less Dense	9,181	7%	2,552	28%	1,107	12%	5,522	60%	—	—
Open	110,546	87%	23,583	21%	1,559	1%	83,804	76%	1,600	100%
Regional Total:	126,508	100%	28,146	22%	4,135	4%	92,627	73%	1,600	1%

BERKSHIRE REGION

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Ashmere Lake	Hinsdale Peru	347
2.	Clarksburg	Clarksburg	368
3.	Great Barrington	Great Barrington	284
4.	Linden Bates	Hancock	524
5.	Shaker Memorial	Hancock Pittsfield	614
6.	Taconic Trail	Williamstown	558
7.	Wahconah Falls	Dalton Hinsdale Windsor	53

State Forests

8.	BashBish	Mt. Washington	3,679
9.	Beartown	Great Barrington Lee Monterey Stockbridge Tyringham	9,401
10.	Campbells Falls	New Marlborough	5
11.	Clarksburg	Clarksburg	2,906
12.	Cookson	New Marlborough Sandisfield	2,378
13.	East Mountain	Great Barrington Sheffield	1,875
14.	Florida- North Adams	Florida North Adams	510
15.	Mohawk Trail	Charlemont Florida Hawley Savoy	6,451
16.	Monroe	Monroe Florida	4,057
17.	October Mountain	Becket Lee Lenox Washington	15,711
18.	Otis	Becket Otis Sandisfield Tyringham	4,391
19.	Peru	Peru Middlefield Worthington	2,860
20.	Pittsfield	Hancock Lanesboro Pittsfield	7,970
21.	Sandisfield	New Marlborough Sandisfield Monterey	4,173
22.	Savoy	Adams Florida North Adams Savoy	10,846
23.	Swann	Monterey	979
24.	Windsor	Savoy Windsor	1,791

State Reservations

25.	Mt. Greylock	Adams Lanesborough New Ashford North Adams Williamstown	10,376

Miscellaneous Properties

26.	West Lake Recreation Area	Sandisfield	1,100

Division of Fisheries & Game

27.	Becket	Becket	235
28.	Housatonic	Lenox	247
29.	Peru	Peru	5,525
30.	Savoy	Savoy	420
31.	Stafford Hill	Cheshire	565
32.	Forbush Wildlife Sanctuary	Hancock	268

County Reservations

33.	Mt. Everett	Sheffield	1,141

Trustees of Reservations

34.	Bartholomew's Cobble	Sheffield	169
35.	Monument Mountain	Great Barrington	257
36.	Naumkeag	Stockbridge	46
37.	Notchview	Windsor	3,000
38.	Tyringham Cobble	Tyringham	222

Massachusetts Audubon Society

39.	Pleasant Valley Wildlife Sanctuary	Lenox	670

VI-4. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. In the Berkshire Region 126,508 recreation and open-space acres were identified. Analysis of these lands by ownership class and population density grouping is shown in table VI-2.

Together state and private ownership account for 95% of open-space and recreation acres. The bulk of these lands is located in the *open* areas while the two *dense* urban areas, containing 73% of the Region's population, have only 13% of recreation and open-space lands.

Water Resources

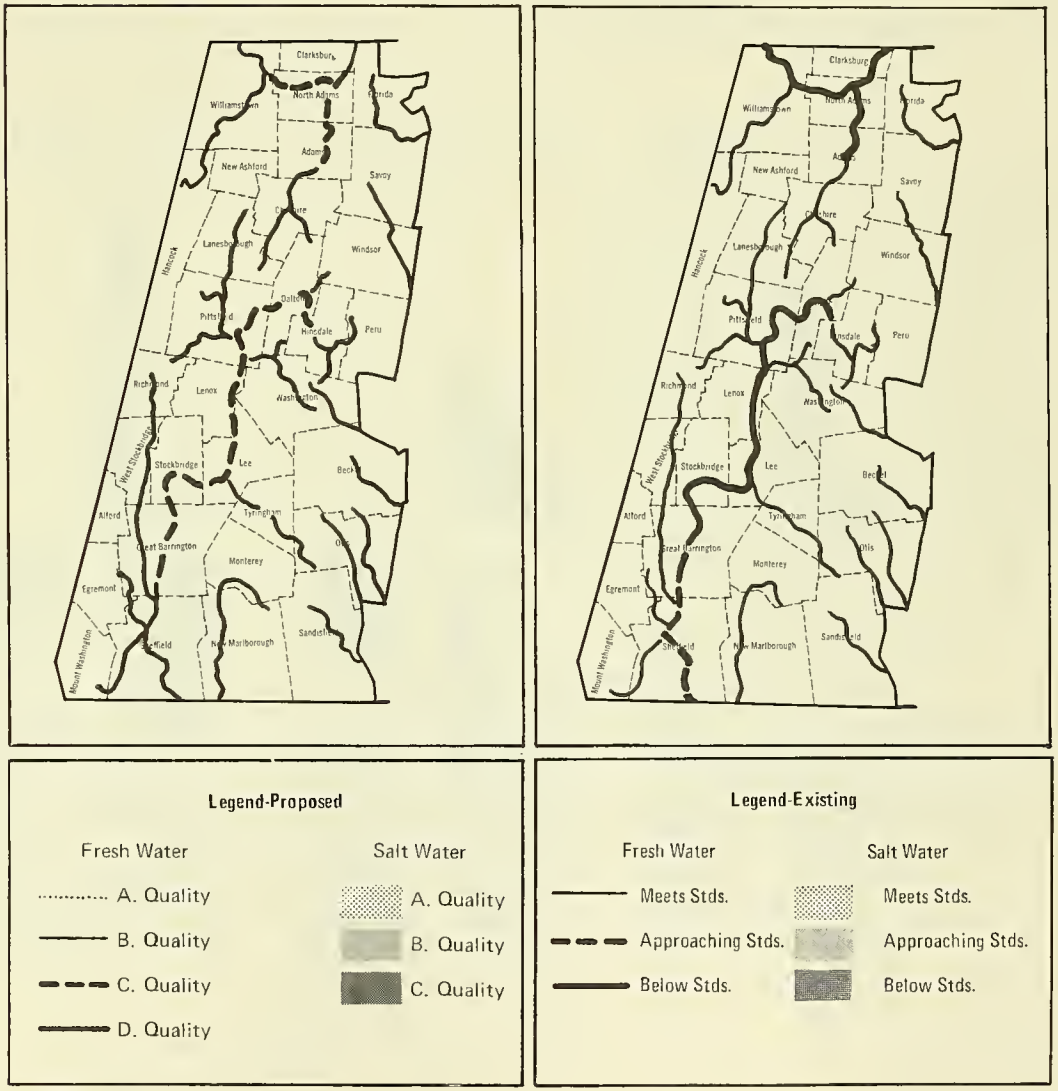
There are an estimated 84 impoundments and great ponds (natural water bodies over ten acres) in Berkshire. Standing surface water totals 7791 acres, but much of this water area is unavailable for recreation use because it is needed for water supplies or public access is restricted by private shoreline ownership. The two largest rivers, the Hoosic and the Housatonic, have a boating potential, particularly during the spring high runoff when white-water canoeing is a challenge. Areas of pollution, poor river access and artificial embankments are the greatest obstacles. Fishing in many of the Region's smaller streams is excellent and offers a real resource to sportsmen. The two maps in figure VI-5 show the existing water quality for the Region's major streams relative to the standards proposed by the Massachusetts Water Resources Commission, Division of Water Pollution Control.

Facilities

Recreation facilities for the four major activities - picnicking, swimming, camping and boating - were inventoried to determine the regional supply of these facilities. The eight graphs in figure VI-6 visually summarize the percentage of annual activity

Figure VI-5

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS BERKSHIRE 1971



*SEE APPENDIX F

Figure VI-6

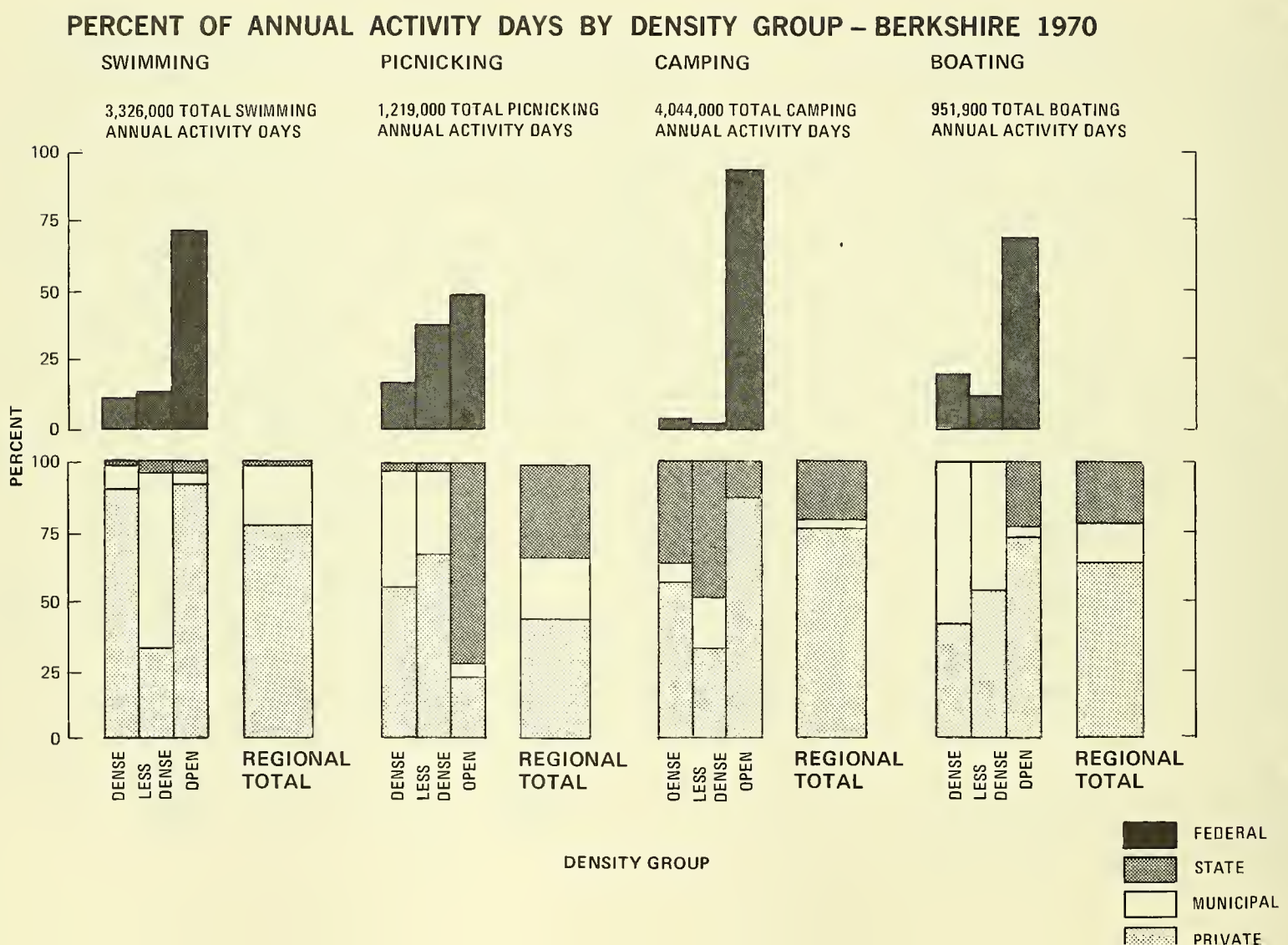
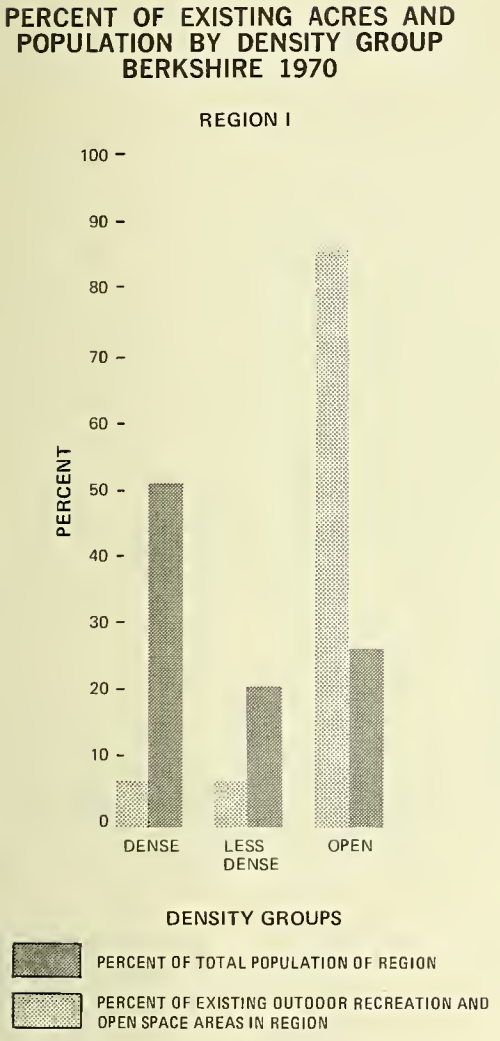

PERCENT OF ANNUAL ACTIVITY DAYS BY DENSITY GROUP – BERKSHIRE 1970
SWIMMING
3,326,000 TOTAL SWIMMING ANNUAL ACTIVITY DAYS
PICNICKING
1,219,000 TOTAL PICNICKING ANNUAL ACTIVITY DAYS
CAMPING
4,044,000 TOTAL CAMPING ANNUAL ACTIVITY DAYS
BOATING
951,900 TOTAL BOATING ANNUAL ACTIVITY DAYS
PERCENT
100
75
50
25
0
DENSE
LESS DENSE
OPEN
REGIONAL TOTAL
DENSITY GROUP
FEDERAL
STATE
MUNICIPAL
PRIVATE

Figure VI-7



days by density group for the Region, and the percentage distribution of recreational facilities by ownership category for each population density group. The total annual activity days for each major recreation activity is also listed.

The following trends are revealed by the graphs:

Nearly all camping facilities and about 75% of swimming facilities and 50% of the picnicking boating facilities are located in the *open* group along with 87% of the open-space and recreation acres.

The largest supplier of recreational facilities is the private sector, even though the State owns the largest percentage of open-space land.

There are several reasons for the difference between the percent of recreation acres owned and the percent of facilities supplied by ownership categories. The private sector, excluding the quasi-public organizations, often must develop land intensively for a profitable return on their investment. On the other hand, state and federal lands reflect the role its agencies play in overall resource management and conservation. On many of these lands recreation is a by-product, or one of several "multiple uses."

Potential Resources

The 1970 Outdoor Recreation and Open Space Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher education institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools, colleges and seminaries. Statewide these lands total 206,619 acres, with 8.1% in the Berkshire Region as shown in table VI-3. While many of these lands will not be available in the near future, they do represent a reserve of open lands with a major recreational potential. Consistent with the trends already noted in the distribution of facilities and open space acreage, these nonrecreational acres are mostly located in the *open* areas.

Table VI-3
Potential Recreation Acres by
Density Group and Ownership Category
1970 — Berkshire Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	—	—	—	—	—	—
Very Dense	—	—	—	—	—	—
Dense	2,374	14%	500	1,694	180	—
Less Dense	2,154	13%	902	1,252	—	—
Open	12,377	73%	2,641	9,599	—	137
Regional Total:	16,905	100%	4,043	12.545	180	137

DEMAND-NEEDS

Lands

Figure VI-7 demonstrates the inverse relationship between the location of recreational lands and population density in the Berkshire Region. However, based on 1970 population figures there appear to be sufficient recreation lands if those available are of the appropriate type and quality. As yet open-space standards have not been adopted for Massachusetts, although nationally it is generally accepted that the minimum is 10-15 acres per 1000 population for urban areas *(very dense* and *extremely dense).* On a basis of acres per 1000 population there are: 85 acres/1000 population for the *dense* group, 287 acres/1000 population for the *less dense* group, and 2987 acres/1000 population for the *open* group.

Although there are sufficient recreation lands by this measure, there are several situations that would justify new acquisitions. Each potential acquisition project will have to be weighed on its own merits.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by regional figures. Facilities and lands to serve local residents may well be needed, particularly neighborhood parks and day-use facilities.
b. New acquisitions may be required to keep pace with population increases and new residential developments.
c. Many diverse types of recreation land were included in the inventory of recreation areas. Although a region may have enough total acreage, it may still be lacking in lands suitable for certain facilities and activities. In the Berkshire Region there is a shortage of swimming and boating opportunities; thus new acquisitions may be aimed to meet specific shortages if suitable public lands are not available and private facilities do not fill the gap.
d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.
e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.
f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue.

Facilities

The relationship between the supply of facilities for swimming, picnicking, camping and boating and the demand for them is shown in table VI-4.

This table generally reveals an inverse relationship between the recreation demand and the supply of facilities for the four activities. Except for picnicking, over two-thirds of the supply is located in the *open* category, while much of the demand is concentrated in Pittsfield and North Adams, the two communities in the *dense* population group. Specific surpluses or deficits cannot be implied by the percentage imbalances between the supply and demand. These percentages act as indicators suggesting locations for future facilities. A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the Statewide Needs chapter.

Camping is the activity that shows the greatest imbalance in its distribution, but this inverse relationship is to be expected because camping is an activity which is enhanced by its away-from-home travel aspect. On the other hand, swimming is considered to be an activity participated in at a local level. Ideally, swimming facilities should be within walking or bike riding distance from home. Thus table VI-4 suggests that swimming facilities are maldistributed.

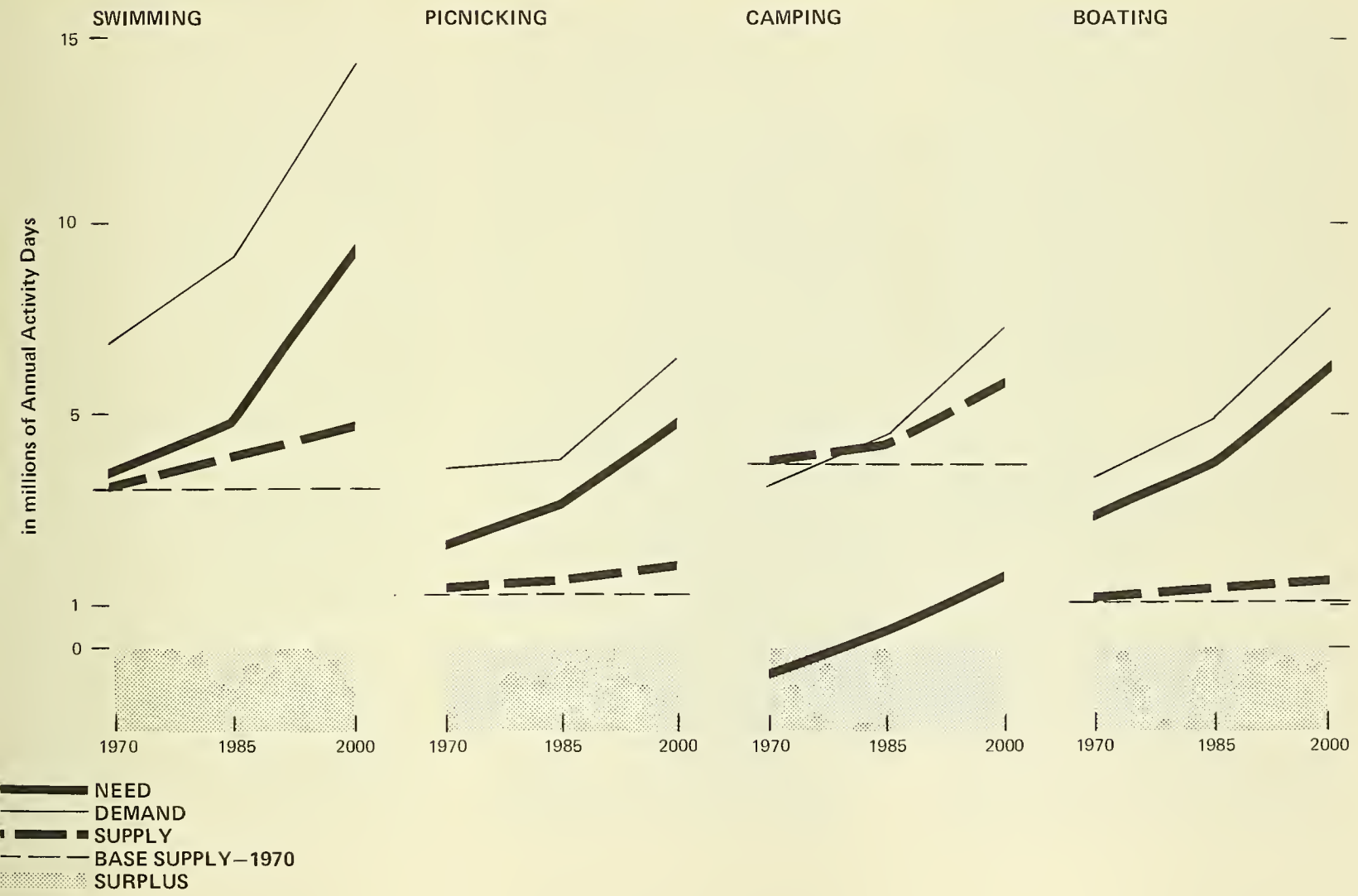
In figure VI-8 the relationship between supply, demand and needs for the four activities at the present and for 1985 and 2000 is shown.

Table VI-4
Supply and Demand by Density Group for Four Activities, 1970
Berkshire Region

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	—	—	—	—	—
Very Dense	—	—	—	—	—
Dense	14%	16%	4%	21%	39%
Less Dense	15%	37%	2%	11%	22%
Open	71%	47%	94%	68%	39%
Regional Total:	100%	100%	100%	100%	100%

Figure VI-8

NEEDS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – BERKSHIRE



Swimming shows the greatest need with nearly twice as many facilities needed as are provided. By projecting current supply at a rate corresponding to present program levels, it becomes apparent that unmet swimming needs will increase greatly between 1985 and 2000. If these needs are to be met, the implication is strong that existing public and private programs providing swimming will have to be greatly increased.

The pattern for picnicking and boating needs is similar, although the need in activity days is not nearly as great. Only camping projects a surplus and will continue to do so until about 1980. With the present revitalized interest in the out-of-doors and the revival of other activities involving camping as an adjunct, it may be overly optimistic to rely on this surplus. During peak summer weekends campgrounds in the Berkshire Region are already crowded.

It is recognized that needs exist for other activities. However, at present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs chapter. It is probably safe to assume that present and projected needs for these activities show a similar pattern to the four activities.

REGIONAL PLANNING AGENCY RECOMMENDATIONS

Planning services for the Berkshire Region are provided by the Berkshire County Regional Planning Commission. Although the Commission has not yet published its own open-space plan, it has participated in the sponsorship of a *Berkshire-Franklin Resource Conservation and Development Project* in 1970. Cooperating with the U. S. Department of Commerce, the Commission participated in the sponsorship and preparation of a technical assistance project publication, *Recreation-Vacation-Tourism in Northern Berkshire, Massachusetts (1964).* These two documents have been reviewed to determine recommendations of the regional planning agency regarding open space and recreation relevant to the framework of this Plan.

Major recommendations contained in these plans are listed below. They are consistent with the priorities of this Plan and thus are incorporated as part of the SCORP recommendations for this Region. Since they came from several sources the recommendations have sometimes been restated to standardize the presentation format.

1. The most important requirement is that simple recreation opportunities should be provided close to where people live.
2. The development of public outdoor recreation facilities to meet anticipated demands of residential growth, as well as those of increased tourism, should be encouraged.
3. The preservation of open spaces and natural areas in the path of urban expansion should provide for small parks interspersed throughout suburban developments. These facilities should be relatively plentiful and easily accessible for short-period use.
4. The preservation and enhancement of the major scenic and historic sites should be encouraged and local recognition of the economic values in retaining the integrity of the natural beauty and character of the area should be stimulated.
5. Wildlife resources should be improved by:
    a. Establishment of wildlife management demonstration areas.
    b. study of improved access to rivers and streams, and
    c. action to secure access to lakes and ponds.
6. The Region's inherent advantages should be developed to increase recreation, vacation and tourism.

Region II: Connecticut Valley

THE SETTING FOR RECREATION

General Characteristics

The Connecticut Valley Planning Region extends from Vermont and New Hampshire in the north to Connecticut in the south; from the eastern slopes of the Berkshire Hills in the west to the Central Highlands in the east. It contains all of Hampden, Hampshire and Franklin counties. Essentially the area covers the Massachusetts portion of the Connecticut River watershed.

The Region's most outstanding feature is the Connecticut River with its broad, flat valley (elevations 100-200 feet) surrounded by uplands with elevations over 1000 feet. The Region is probably the most geologically interesting in the state; Triassic red beds contain dinosaur footprints and traprock ridges rise in the Mt. Tom - Mt. Holyoke ranges. Quabbin Reservoir, formed from the drowned Swift River Valley, is the Region's eastern boundary.

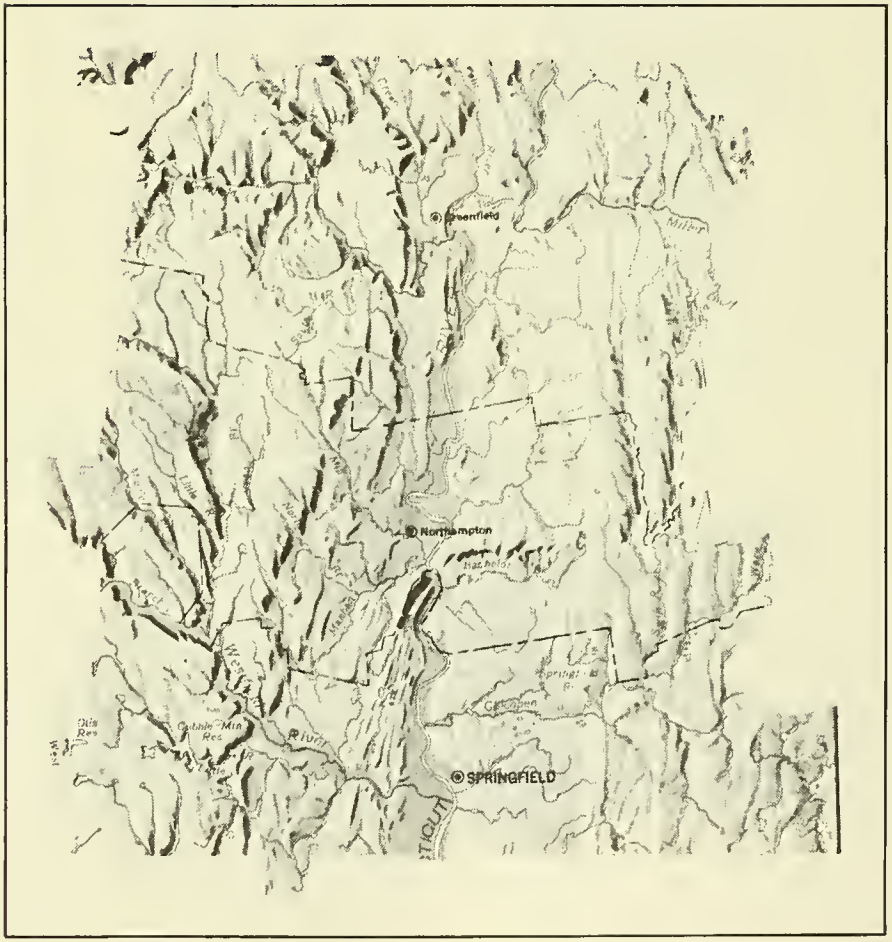
The pattern of settlement reflects regional landforms. Earliest settled was the flat valley, while the uplands with steep slopes, less fertile soils and poor access to river transportation were slow to develop. The uplands are still sparsely settled and now contain the Connecticut Valley's greatest reserve of open lands.

History and Culture

Adding to the rich natural heritage are the towns of Turners Falls and Gill, once important Indian fishing places and scene of several bloody clashes between Indians and settlers during King Philip's War (1675-76). Near Turners Falls the first dinosaur prints in North America were discovered in 1802. Since that time many important fossil

Figure VI-9

RELIEF MAP – CONNECTICUT VALLEY



tracks have been found on Barton's Cove peninsula in Gill and near Mt. Tom in Easthampton. The Connecticut Valley contains a rich cultural and educational heritage that includes the University of Massachusetts, Amherst, Smith and Mt. Holyoke colleges and Deerfield Village and Academy. In addition, the area contains prime agricultural lands for the growing of tobacco, potatoes, onions and asparagus.

Franklin County, in the northern part of the Valley, is in the process of becoming a major exporter of electric power. When all projects underway are completed, local demand will be less than 10% of the peak generating capacity. Such use of the Region's natural resources has as profound an environmental impact as does the export of water to Boston through the Quabbin Reservoir system.

Population

With 642,241 people, (11% of Massachusetts' population) and 1910 square miles, (23% of the state's land), the Connecticut Valley is the second largest SCORP planning region. It has five cities and 64 towns and contains the state's second largest metropolitan area. More than half of the towns in the Region are in the *open* density group; while the greatest population concentration is along the Connecticut River especially in the southern portion of the Region (see figure VI-10 and table VI-5). Living in the Valley are more than 15,000 poverty-level families, most of which are located in the *dense* and *very dense* areas. Because more than 40% of these families are without automobiles, their access to public recreation facilities is very difficult. There are also many college students in the Region and young people generally have different types of outdoor recreation preferences than families.

Table VI-5
Population and Land and Water Acres by Density Group, 1970
Connecticut Valley Region

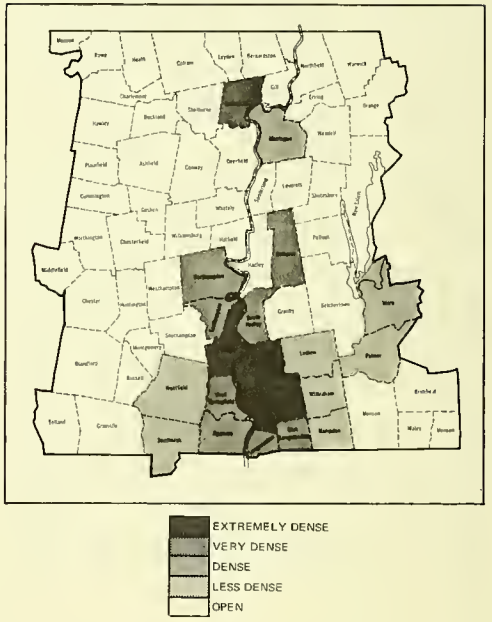
Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	—	—	—
Very Dense	280,693	44%	4%
Dense	182,993	28%	10%
Less Dense	100,217	16%	13%
Open	78,338	12%	73%
Regional Total:	642,241	100%	100%

Transportation

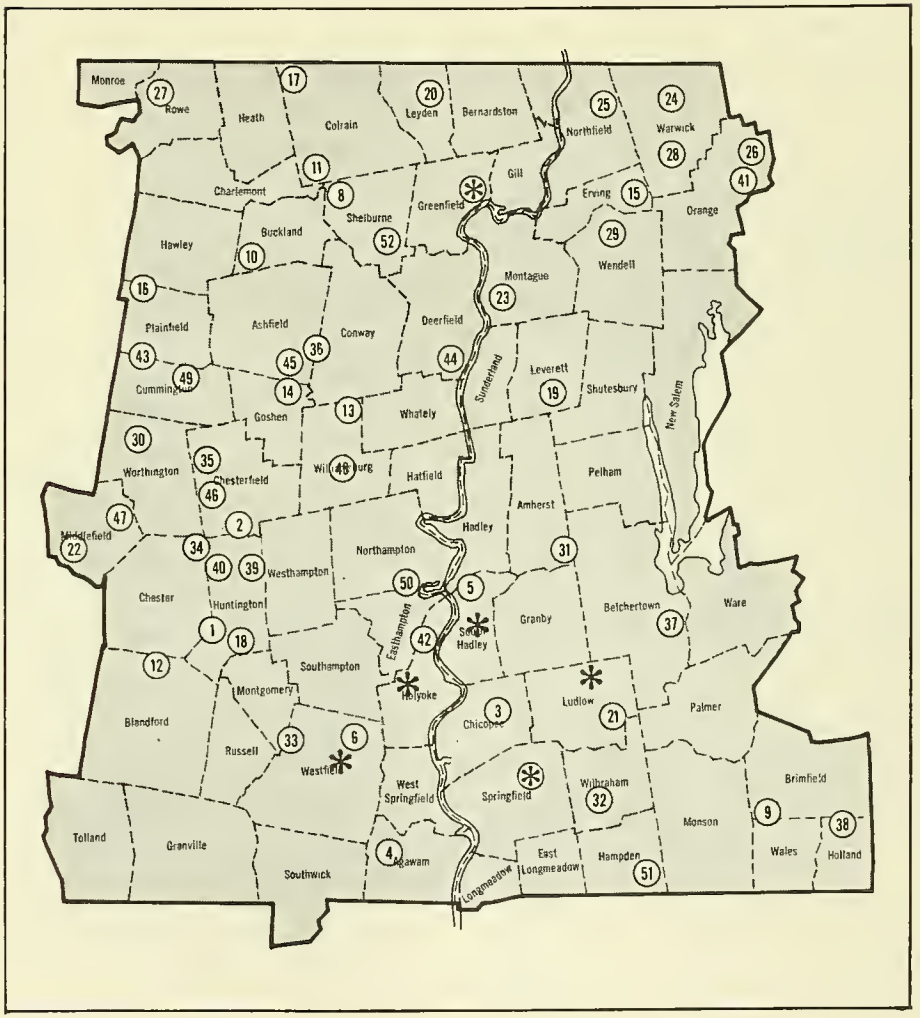
Early in the nation's development the Connecticut River Valley served as a major transportation corridor to the north. This locational advantage spurred the Region's early growth. The area continues to be well served by transportation. Major rail lines and highways intersect near Springfield and make the city one of the major crossroads of New England. From Springfield public transportation by rail and bus is available to other cities. The Springfield-Hartford area is served by Bradley International Airport at Windsor Locks in Connecticut as well as by municipal airports in Westfield and North Hatfield.

Figure VI-10

POPULATION DENSITY CONNECTICUT VALLEY 1970



SELECTED RECREATION LANDS AND SITES CONNECTICUT VALLEY 1970



Recreational Potential

The Valley has several areas of recreational significance. One of the most scenic drives in the state is in the north where Route 2, the Mohawk Trail, winds its way through magnificent mountain ravines and over the Connecticut River at the French King Bridge. To the south on the Connecticut River in the Mt. Holyoke - Mt. Tom-Oxbow area are excellent opportunities for boating, water skiing, fishing, hiking, picnicking and downhill skiing. All these sites are close to the heart of the second largest metropolitan area in the state - Springfield, Holyoke and Chicopee (total population 523,029). The Mt. Tom - Mt. Holyoke-Oxbow area offers so many scenic, recreational and environmental attractions that the U.S. Department of the Interior is considering developing it as part of the proposed Connecticut River National Recreation Area. Bike trails for college students would further complement the recreation area proposal.

Increasingly public utility companies are providing recreation facilities. The pumped storage projects at Northfield and at Bear Swamp in Florida (Berkshire Region) include hiking trails, picnic groves and interpretive displays as part of the projects' development. Power transmission right-of-way have great trails potential in a region containing numerous power generation facilities. Much of the Connecticut Valley is undeveloped and offers the potential to serve recreational needs generated both within and outside the Region.

CONNECTICUT VALLEY

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Charles M. Gardner	Huntington	29
2.	Chesterfield Gorge	Chesterfield	844
3.	Chicopee Memorial	Chicopee	574
4.	John C. Robinson	Agawam	858
5.	Joseph A. Skinner	Hadley South Hadley	373
6.	Hampton Ponds	Westfield	9
7.	North Sugarloaf	Deerfield	447
8.	Wilcox Hollow	Shelburne	25

State Forests

9.	Brimfield	Brimfield Monson Wales	3,289
10.	Buckland	Buckland	145
11.	Catamount	Colrain	1,111
12.	Chester-Blandford	Blandford Chester	2,298
13.	Conway	Conway Williamsburg	2,006
14.	Daughters of the American Revolution	Ashfield Goshen	1,517
15.	Erving	Erving Orange Warwick	3,040
16.	Hawley	Hawley Plainfield Windsor	7,676
17.	H. O. Cook	Colrain	814
18.	Huntington	Huntington Montgomery	482
19.	Leverett	Leverett	91
20.	Leyden	Leyden	61
21.	Ludlow	Ludlow	50
22.	Middlefield Park	Middlefield	
23.	Montague	Montague	25
24.	Mount Grace	Warwick	1,441
25.	Northfield	Northfield	237
26.	Orange	Orange	59
27.	Rowe	Rowe	267
28.	Warwick	Northfield Orange Royalston Warwick	8,462
29.	Wendall	Montague New Salem Orange Wendall	7,857
30.	Worthington	Worthington	175
31.	Market Tract	Amherst Belchertown	139

Division of Fisheries & Game

32.	Wilbraham State Game Farm	Wilbraham	144
33.	Grace Robinson Wildlife Sanctuary	Montgomery Westfield	70
34.	Canada Hill	Chester Chesterfield Huntington Worthington	1,825
35.	Healy Property	Chesterfield	
36.	Poland Brook	Ashfield Conway	525
37.	Swift River	Belchertown Ware	1,078

U.S. Department of Defense
Army Corps of Engineers

38.	East Brimfield Reservoir	Brimfield Holland	1,550
39.	Knightville Reservoir	Huntington	2,430
40.	Little Flood Control Area	Huntington	1,612
41.	Tully Reservoir	Orange	29

County Reservations

42.	Mount Tom	Holyoke Easthampton	1,800
43.	Deer Hill	Cummington Plainfield	258
44.	Mount Sugarloaf	Deerfield	447

Trustees of Reservations

45.	Chapelbrook	Ashfield	128
46.	Chesterfield Gorge	Chesterfield	172
47.	Glendale Falls	Middlefield	60
48.	Petticoat Hill	Williamsburg	60
49.	William Cullen Homestead	Cummington	189

Massachusetts Audubon Society

50.	Arcadia Wildlife Sanctuary	Easthampton Northampton	400
51.	Laughing Brook	Hampden	84
52.	The Ledges	Shelburne	400

SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open-Space Inventory are shown in figure VI-11. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. In the Connecticut Valley a total of 182,796 recreation and open-space acres were identified. Analysis by ownership class and population density group is shown in table VI-6.

State and private ownership account for 90% of the recreation acres. In *very dense* areas the largest supplier of open space and recreation is the municipality, whereas in the *open* areas the state is the largest owner of open-space acreage.

Water Resources

In the Connecticut Valley there are an estimated 139 great ponds (those over ten acres) or impounded waters. The total standing surface water acreage is 33,817 acres. Of this total, 24,700 acres are in the Quabbin Reservoir, which is part of Boston's water supply system and therefore is severely restricted to public access. Theoretically, then, less than 10,000 acres are available for recreational use and even this figure does not reflect the true situation because of limited access.

The Connecticut River is the major river in the Region. Added to the difficulty of access to the river is the problem of pollution which diminishes the quality of water-oriented recreation. Figure VI-12 shows the existing water quality for the Region's major streams relative to the standards proposed by the Massachusetts Water Resources Commission's Division of Water Pollution Control.

Table VI-6
Existing Recreation Acres by Density Group and Ownership Category, 1970
Connecticut Valley Region

Density Group	Total		Ownership Category							
			Private		Municipal		State		Federal	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	—	—	—	—	—	—	—	—	—	—
Very Dense	5,023	2%	1,208	25%	2,393	65%	577	10%	—	—
Dense	12,773	7%	4,871	38%	2,402	54%	990	8%	—	—
Less Dense	17,820	10%	6,057	34%	1,374	11%	9,769	55%	—	—
Open	147,180	81%	34,306	23%	5,247	4%	106,741	73%	—	—
Regional Total:	182,796	100%	46,442	25%	11,416	10%	118,077	65%	—	—

Facilities

Recreation facilities for the four major activities - picnicking, swimming, camping and boating - were inventoried to determine the regional supply of these facilities. The eight graphs in figure VI-13 summarize the percentage of annual activity days by density group for the Region, and the percentage distribution of recreational facilities by ownership category for each population density group. The total annual activity days for each major recreation activity is also listed.

Analysis of the total recreation supply in the Connecticut Valley reveals several trends:

Most of the Region's open space is located in the least densely settled sections. Also most recreational facilities are concentrated in areas of lowest population density, with the exception of boating facilities which are fairly well distributed.

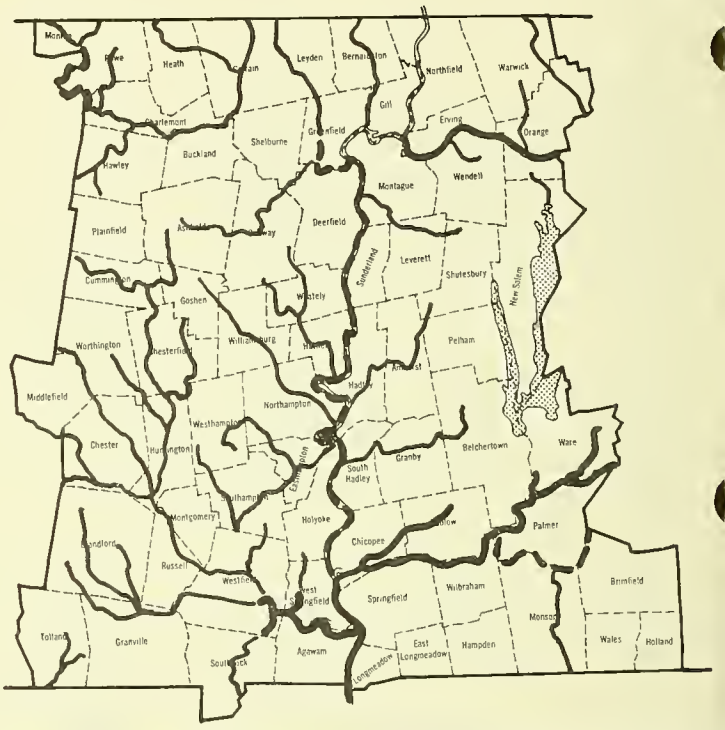
Although the state supplies the largest percentage of recreational open-space acreage, the largest supplier of recreation facilities is the private sector.

There are several reasons for the difference between the percent of recreation acres owned and the percent of facilities supplied by ownership categories. The private sector, excluding the quasi-public organizations, often must develop land intensively for a profitable return on its investment. On the other hand, state and federal lands reflect the role their agencies play in overall resource management and conservation. On many of these lands recreation is a by-product or one of several "multiple uses".

Potential Resources

The 1970 Outdoor Recreation and Open Space Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher education

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS CONNECTICUT VALLEY 1971



Legend-Proposed

Fresh Water	Salt Water
..... A. Quality	A. Quality
——— B. Quality	B. Quality
- - - C. Quality	C. Quality
——— D. Quality	

Legend-Existing

Fresh Water	Salt Water
——— Meets Stds.	Meets Stds.
- - - Approaching Stds.	Approaching Stds.
——— Below Stds.	Below Stds.

*SEE APPENDIX F

PERCENT OF ANNUAL ACTIVITY DAYS BY DENSITY GROUP – CONNECTICUT VALLEY 1970

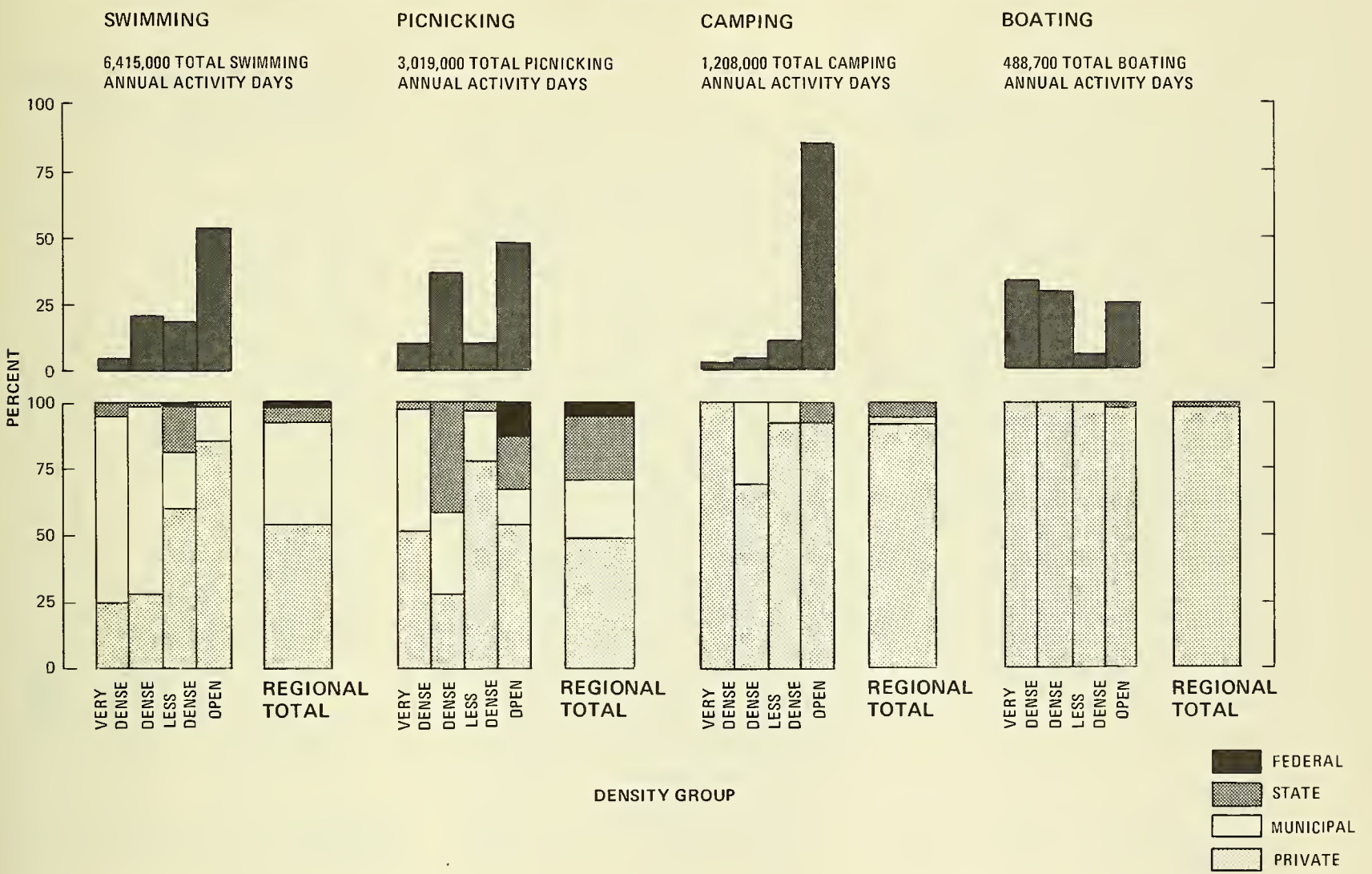


Table VI-7
Potential Recreation Acres by Density Group and Ownership Category, 1970.
Connecticut Valley Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	—	—	—	—	—	—
Very Dense	2,473	4%	13	2,222	238	—
Dense	5,853	8%	484	3,606	1,763	—
Less Dense	9,874	14%	712	8,317	845	—
Open	52,872	74%	12,237	34,071	843	5,721
Regional Total:	71,072	100%	13,446	48,216	3,689	5,721

institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools, colleges and seminaries. Statewide these lands total 206,619 acres (see table VI-7). A substantial portion, 34% of these lands, is located in the Connecticut Valley.

Although many of these areas may not become available in the near future for recreational use, they still constitute a major potential resource. The location of these lands is consistent with trends noted in the distribution of facilities and dedicated open space; they are mostly located in the *open* areas, away from the large population centers.

DEMAND-NEEDS

Lands

As shown in figure VI-14, the location of recreational lands in the Connecticut Valley Region is inversely related to population density. However, the *dense, less dense* and *open* areas average 75 acres or more per 1000 population, with the *less dense* areas averaging 178 acres per 1000 population and the *open* areas 1886 acres per 1000 population. The *very dense* population areas, which are the Region's most urbanized, average 18 acres per 1000 population. About 64% of recreation lands in the *very dense* areas are municipal sites which average about 11.4 acres per 1000 population. Generally accepted recreation standards for city recreation areas fall between 10-15 acres per 1000 population.

Based on 1970 population levels, the Connecticut Valley has, for the most part, sufficient recreation lands for each density group. While potential acquisition projects would have to be weighed on individual merits, there are several situations that may justify new land acquisitions.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by the regional figures. Facilities and lands to serve local residents may well be needed, particular-

Figure VI-14

ly neighborhood parks and day use facilities.

b. New acquisitions may be required to keep pace with population increases and new residential developments. This would be especially true in the *very dense* and *dense* areas of the Connecticut Valley Region.

c. Many diverse types of recreation land were included in the inventory of recreation areas. Although a region may have enough total acreage, it may still be lacking in lands suitable for certain facilities and activities. In the Connecticut Valley Planning Region this situation could be particularly true for water-based recreation activities.

d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.

e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.

f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue.

Facilities

The relationship between the supply of facilities for swimming, picnicking, camping and boating and demand for them is shown by density groups in table VI-8.

This table generally reveals an inverse relationship between the recreation demand and the supply of facilities for the four activities. This is particularly true of swimming and camping where the majority of the supply is located in the *open* category, while much of the demand is concentrated in the communities of *dense* and *very dense* population. Camping is the activity that shows the greatest imbalance in its distribution, but this inverse relationship is to be expected because camping is an activity which is enhanced by its away-from-home travel aspect. On the other hand, swimming is considered to be an activity participated in at a local level. Ideally, swimming facilities should be within walking or bike riding distance from home. Thus table VI-8 suggests that swimming facilities are maldistributed. Boating facilities generally follow population distribution patterns while picnicking facilities in *very dense* and *less dense* areas are considerably below their proportion of the Region's population.

Specific surpluses or deficits cannot be implied by the percentage imbalances between the supply and demand. These percentages act as indicators suggesting locations for future facilities. A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the Statewide Needs chapter.

In figure VI-15 the relationship between supply, demand and needs for the four activities for 1970, 1985 and 2000 is shown. Swimming shows the greatest need with nearly twice as many facilities needed as are provided. By projecting current supply at a rate corresponding to present program levels, it becomes apparent that unmet swimming needs will increase greatly between 1985 and 2000. If these needs are to be met, the implication is strong that existing public and private programs providing swimming will have to be greatly increased.

The pattern for picnicking, camping and boating needs is similar, although the need in activity days is not nearly as great. Again, the implication is that programs will have to be significantly increased if needs are to be met.

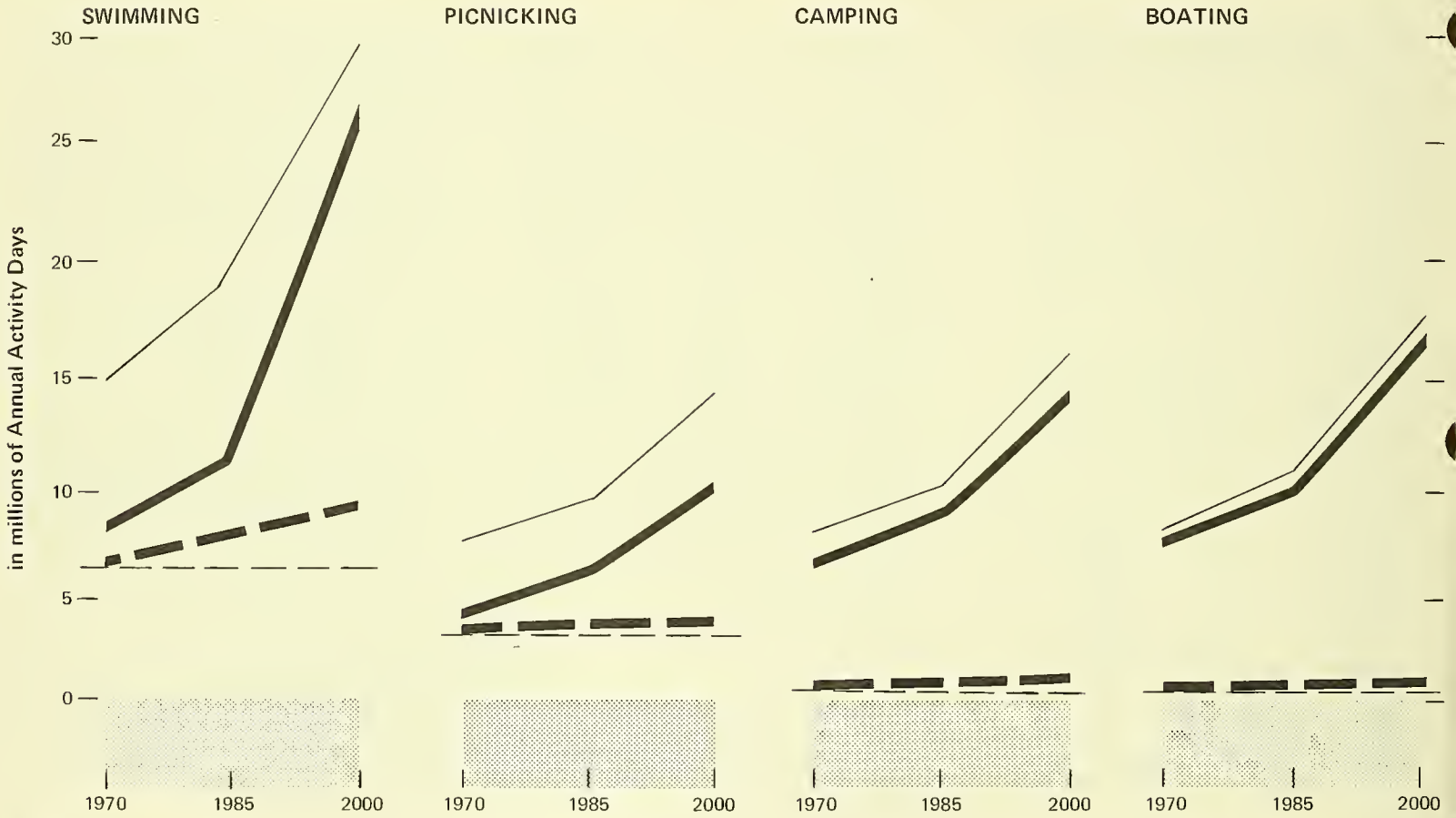
It is recognized that needs exist for other activities. However, at present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs chapter. It is probably safe to assume that present and projected needs for these activities show a similar pattern to the four activities.

Table VI-8
Supply and Demand by Density Group for Four Activities, 1970
Connecticut Valley Region

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	—	—	—	—	—
Very Dense	6%	9%	2%	35%	44%
Dense	22%	35%	3%	32%	28%
Less Dense	19%	9%	11%	7%	16%
Open	53%	47%	84%	26%	12%
Regional Total:	100%	100%	100%	100%	100%

Figure VI-15

NEEDS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – CONNECTICUT VALLEY



REGIONAL PLANNING AGENCY RECOMMENDATIONS

The Lower Pioneer Valley Regional Planning Commission, serving Hampden and Hampshire counties, published its *Outdoor Recreational Open Space* report in 1970 and the Franklin County Planning Department, serving Franklin County, published its *Open Space* report in 1971. These two documents have been reviewed to determine regional recommendations relevant to the framework of this Plan. Major recommendations contained in these plans are listed below. They are consistent with this Plan and thus are incorporated as part of SCORP recommendations for this Region. Because they came from several sources the recommendations have occasionally been restated to standardize the presentation format. Editorial comments are noted by parentheses and serve to tie the Regional Planning Commissions' recommendations to this Plan.

1. The most important objective is to serve the needs of local residents by providing abundant open space and recreation for all residents, meeting outdoor recreation needs of a growing population with increasing leisure time and providing accessible open space that permits necessary urban growth while protecting the natural environment and historical heritage.
2. Water-oriented recreation calls for:
   a. fuller utilization of waterways through improved public access to ponds presently landlocked by private ownership or undeveloped due to inaccessibility,
   b. pollution abatement, and
   c. multipurpose reservoir use and a relaxation of restrictions on water supply lands and reservoirs.
3. Family recreation calls for improvements in existing camping and picnic facilities as well as new developments.
4. Trails needs call for:
   a. more study to explore potentials and to prepare plans,
   b. fuller, more imaginative use of existing highways, abandoned roads, and utility rights-of-way.

Priorities stated were:

1. The most important priority is to acquire land where the majority of the population resides and where the natural resources are in the greatest danger of development (within the Connecticut Valley this represents the *very dense* and *dense* areas of population). Also good local park systems are needed for local residents.
2. The highest functional priority is for water-based recreation which would anchor a regional waterway greenbelt system.
3. A regional wildlife management and conservation system must be accomplished through the preservation of wetland resources.
4. Of lesser priority, but still important, is a regional mountain range and ridgetop greenbelt trail system to preserve scenic values, open-space values and recreation potentials of the Connecticut Valley.

Region III: Central Highlands

THE SETTING FOR RECREATION

General Characteristics

The Central Highlands Planning Region, which contains all of Worcester County and parts of Middlesex County, extends from New Hampshire in the north to Connecticut and Rhode Island in the south; from a north-south line bisecting Quabbin Reservoir in the west to a north-south line bisecting Wachusett Reservoir in the east. Bordered on both sides by lowlands, the Region is plateau-like with elevations of about 500 feet in its valleys but over 1100 feet in the uplands. Lakes and ponds resulting from glaciation are a major feature. Mount Wachusett, a classic example of a monadnock (an erosional remnant), has an elevation of 2006 feet and stands above the surrounding countryside. The Central Highlands' major streams are the Blackstone, French, Nashua and Quabog rivers.

History and Culture

Lancaster was the first town in the Region to be settled (1641) but trouble with the French and Indians during King Philip's War prevented any permanent settlement of almost the entire area. In 1673 Quinsigamond, the county seat (now Worcester), had to be abandoned and it was not until 1713 that permanent settlements were made.

During the 1800's Central Highlands towns and cities grew up around new prospering industries. Cloth weaving and carpet-making, along with smaller, specialized craft industries, were important. Worcester became the center of a system of stagecoach lines lacing this section of the state. Roads were often impassable during winter and wet weather; thus the Blackstone Canal was built to move heavy goods between Worcester and Providence, Rhode Island. The prospect of cheap freight transport stimulated growth in Worcester; and the Canal was replaced by a railroad.

Early Central Highlands entrepreneurs produced many inventions and innovations that revolutionized manufacturing. The cotton gin, parts standardization, sewing machine improvements, the power carpet loom and wire making all started here. Today the Region produces mechanical machinery, fabricated metals, rubber products, plastics, textiles, leather and leather products.

Worcester has a long tradition of dramatic, musical and civic activity. The city is home to eight colleges. Located throughout the Region and open to the public are numerous historic sites and museums, including the Worcester Art Museum which has many famous works.

Population

With 521,976 people (9% of the Commonwealth's population) and approximately 1360 square miles (17% of the land and water area), the Central Highlands is the third largest of the seven SCORP planning regions in both size and population. In the Central Highlands there are 42 towns and four cities; Worcester (176,572) is the Region's largest city.

Of the Region's 46 municipalities, one is in the *very dense* group, seven are in the *dense* group, 11 are in the *less dense* group and 27 are in the *open* population group (see figure VI-17 and table VI-9).

Worcester is surrounded by a highly urbanized area. The Region's other major population concentrations are centered around the industrial centers of Gardner, Fitchburg and Leominster in the north; and around the manufacturing towns of Southbridge and Webster in the south (see table VI-9).

Transportation

The Central Highlands is well served by public transportation. Bus service links the major cities

Figure VI-16

RELIEF MAP – CENTRAL HIGHLANDS

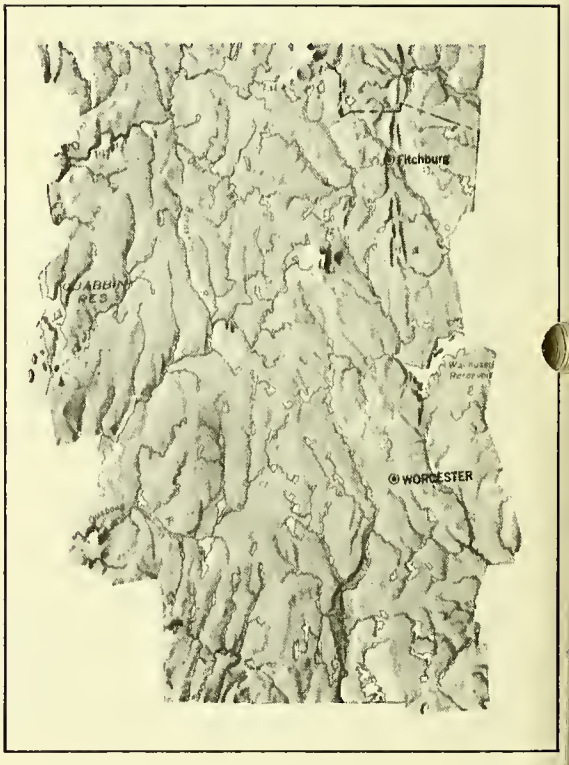


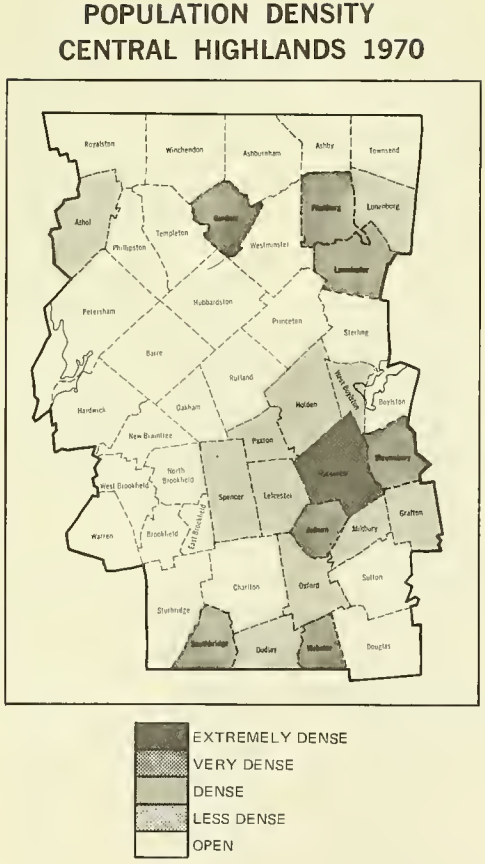
Table VI-9
Population and Land and Water Acres by Density Group, 1970
Central Highlands Region

Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	—	—	—
Very Dense	176,572	34%	3%
Dense	162,547	31%	11%
Less Dense	101,565	20%	20%
Open	81,592	15%	66%
Regional Total:	521,976	100%	100%

to each other and to Boston. There is also daily commuter train service to Boston. Rail freight service is also good and business is sufficient to make some of the lines self-sustaining. Worcester also has a municipal airport.

Major highways link the Central Highlands with New England. Massachusetts Turnpike interchanges connect with Route 15 (Interstate 86), the major highway between New York and Boston and with Interstate 290, the Worcester Connector to Interstate 495. Now under construction is Route 52 which will be a 4-6-lane limited access highway proposed to connect eastern Connecticut with northern New England. Fitchburg and Leominster would benefit from this road because it will give these cities direct access to the south. Route 2, which crosses the Central Highlands in the north, is a four-lane highway much of its distance. The emerging configuration of superhighways truly places this Region in the transportation heart of New England. Industries are beginning to locate in the Region near Interstate 495, immediately to the east of the Highlands, and a growth phenomena similar to that experienced around Route 128 fifteen years ago may take place here. Such economic growth can be expected to stimulate new residential development and increase pressures on open and agricultural lands as the demand for housing increases.

Figure VI-17



SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open-Space Inventory are shown in figure VI-18. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. The Central Highlands has a total of 155,995 acres of recreation and open-

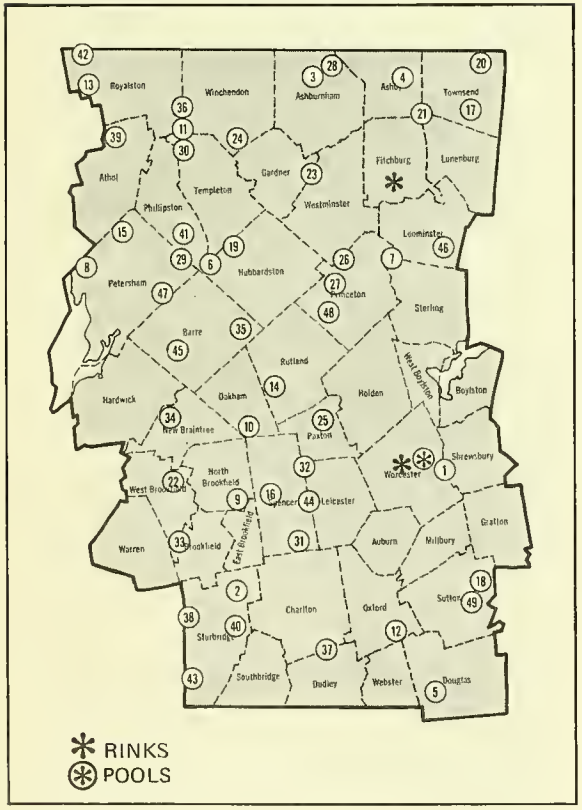
Recreation Potential

The area has a number of good recreational opportunities. Cold, snowy winters favor such winter activities as snowmobiling, ski-touring and downhill skiing at Mt. Wachusett. Scenic attractions include Purgatory Chasm in Sutton, a half-mile fissure in granite rock; Moore Memorial State Park in Paxton where one of the most beautiful artificially enhanced landscapes in New England can be found; and many hilltop towns and villages with New England town commons. The Region's primary tourist attraction is Old Sturbridge Village, a restored colonial New England town.

The Central Highlands has abundant forests and water resources which offer vast recreational potential, especially for hunting and fishing. Among the foremost of these water resources is Quabbin Reservoir, covering nearly 37 square miles (over 24,000 acres) and having a capacity of 412 billion gallons. Although Quabbin is the world's largest man-made lake used exclusively for drinking water (it provides metropolitan Boston's water supply), fishing is permitted on the Reservoir as well as hunting on some designated watershed lands.

Figure VI-18

SELECTED RECREATION LANDS AND SITES CENTRAL HIGHLANDS 1970



CENTRAL HIGHLANDS REGION

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Lake Quinsigamond	Shrewsbury Worcester	39
2.	Wells	Sturbridge	1,081
3.	Moore Memorial	Paxton	310

State Forests

4.	Ashburnham	Ashburnham	1,637
5.	Ashby	Ashby	20
6.	Douglas	Douglas	3,227
7.	Hubbardston	Hubbardston Phillipston	498
8.	Leominster	Fitchburg Leominster Princeton Sterling	2,953
9.	Massachusetts Federation of Women's Clubs	New Salem Petersham	1,083
10.	North Brookfield	North Brookfield	40
11.	Oakham	Oakham	861
12.	Otter River	Royalston Templeton Winchendon	883
13.	Oxford	Oxford	29
14.	Royalston	Royalston	607
15.	Rutland	Rutland	1,900
16.	Petersham	Athol Petersham	593
17.	Spencer	Spencer	1,408
18.	Squannacook River	Townsend	299
19.	Sutton	Sutton	624
20.	Templeton	Hubbardston Templeton	1,495
21.	Townsend	Townsend	3,092
22.	Willard Brook	Ashby Fitchburg Lunenburg Townsend	2,554
23.	West Brookfield	West Brookfield	129
24.	Westminster	Gardner Westminster	1,406
25.	Winchendon	Winchendon	178

State Reservations

26.	Wachuset Mountain	Princeton Westminster	1,696

Division of Fisheries and Game

27.	Hibbs Sanctuary	Princeton	137
28.	Watatic Mountain	Ashburnham	139
29.	Barre-Phillipston	Petersham Phillipston	593
30.	Birch Hill	Royalston Templeton Winchendon	171
31.	Four Chimneys	Spencer	200
32.	Moose Hill	Leicester Paxton Spencer	692
33.	Quaboag	Brookfield · West Brookfield	797
34.	Winimusset	New Braintree	416

Department of Defense:
Army Corps of Engineers

35.	Barre Falls Reservoir	Barre	557
36.	Birch Hill Reservoir—Flood Control Area	Royalston Templeton Winchendon Athol	8,789
37.	Buffumville Reservoir	Charleton Dudley	488

Name	Municipality	Acreage
38. East Brimfield Reservoir	Sturbridge	420
39. Tully Reservoir	Athol	84
40. Westville Reservoir	Sturbridge	578
County Reservation		
41. Purgatory Chasm	Sutton	300
Trustees of Reservations		
42. Elliott Laurel	Phillipston	25
43. Royalston Falls	Royalston	205
44. Tantiusques	Sturbridge	55
Massachusetts Audubon Society		
45. Burncoat Pond	Leicester Spencer	175
46. Cook's Canyon	Barre	40
47. Lincoln Woods	Leominster	60
48. Rutland Brook	Petersham	98
49. Wachusett Meadow	Princeton	948

space land. These lands are shown by ownership class and population density group in table VI-10.

Relative to other SCORP regions recreational acres in the Region are fairly well distributed. It should be noted that Worcester, which is the only community in the *very dense* category, accounts for 15% of the recreation and open-space acreage. This is three times the acreage of the Region's *dense* areas, which contain seven communities. It is also more acreage than is provided by the 11 communities in the *less dense* areas. This fact would tend to indicate a need for more open-space and recreation lands in the *dense* and *less dense* communities, particularly because these areas are experiencing growth.

Water Resources

There are an estimated 271 great ponds (natural water bodies over ten acres) and impoundments which have a total surface of 33,728 acres of standing water. Compared to the other regions, the Central Highlands is substantially better endowed with freshwater resources (3.9% of the area is water surface). Even though the Region is dotted with lakes it is not necessarily a recreationist's paradise. The ever-present problem of access - created by private shoreline ownership and water supply restrictions - serves to limit public enjoyment of these water bodies.

The Region's many streams are famous for good fishing and in rural areas access to them tends to be less of a problem. Because upland streams are small boating potential is limited, although the Quabog, Ware and Quinebog rivers are good for canoeing in the spring. The Nashua and Blackstone, two of the most polluted rivers in the state, have their sources in or near industrial cities of the Region. If these rivers are reclaimed, they will represent a major water-based recreation potential. The two maps in figure VI-19 show a comparison of existing water quality of the major streams with the standards proposed by the Massachusetts Water Resources Commission's Division of Water Pollution Control.

Facilities

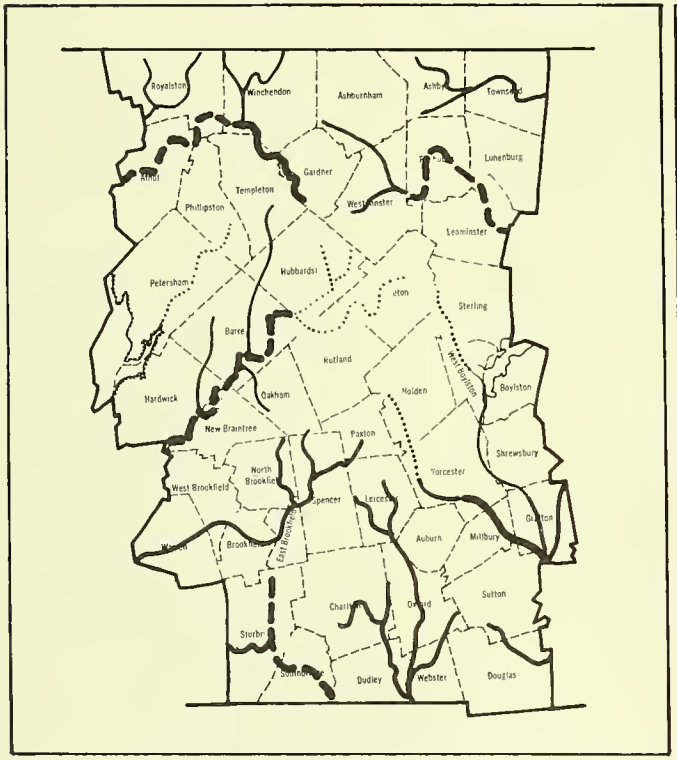
Recreation facilities for the four major activities - picnicking, swimming, camping and boating - were inventoried to determine the regional supply. The eight graphs in figure VI-20 summarize the percentage of annual activity days by density group for

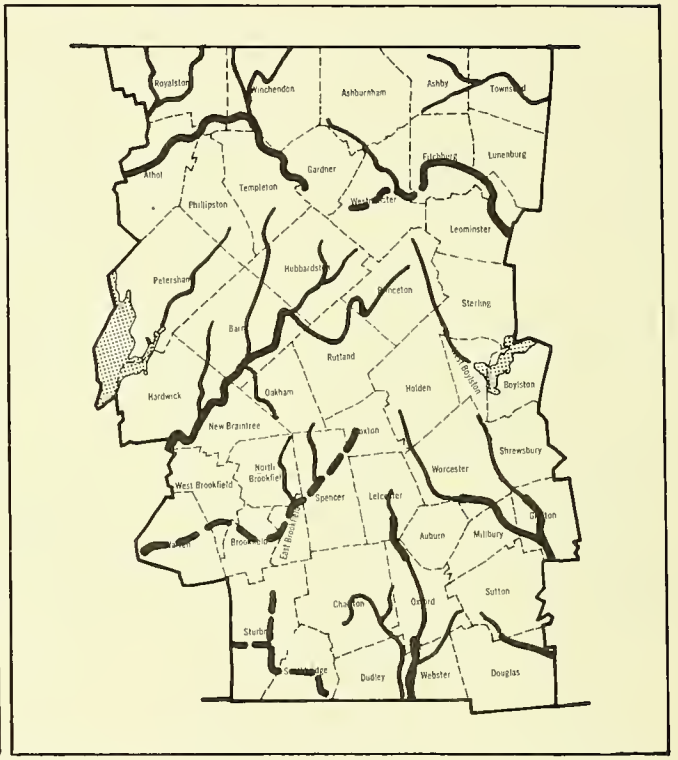
Table VI-10
Existing Recreation Acres by Density Group and Ownership Category, 1970
Central Highlands Region

Density Group	Total		Ownership Category							
			Private		Municipal		State		Federal	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	—	—	—	—	—	—	—	—	—	—
Very Dense	21,983	15%	267	1+%	21,681	98%	35	1%	—	—
Dense	6,748	4%	2,471	37%	2,337	35%	1,362	20%	578	8%
Less Dense	18,951	12%	4,082	22%	3,254	18%	6,242	33%	5,373	27%
Open	108,313	69%	17,014	16%	2,070	2%	82,186	76%	7,043	8%
Regional Total:	155,995	100%	23,834	15%	29,342	19%	89,825	58%	12,994	8%

Figure VI-19

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS CENTRAL HIGHLANDS 1971





Legend-Proposed

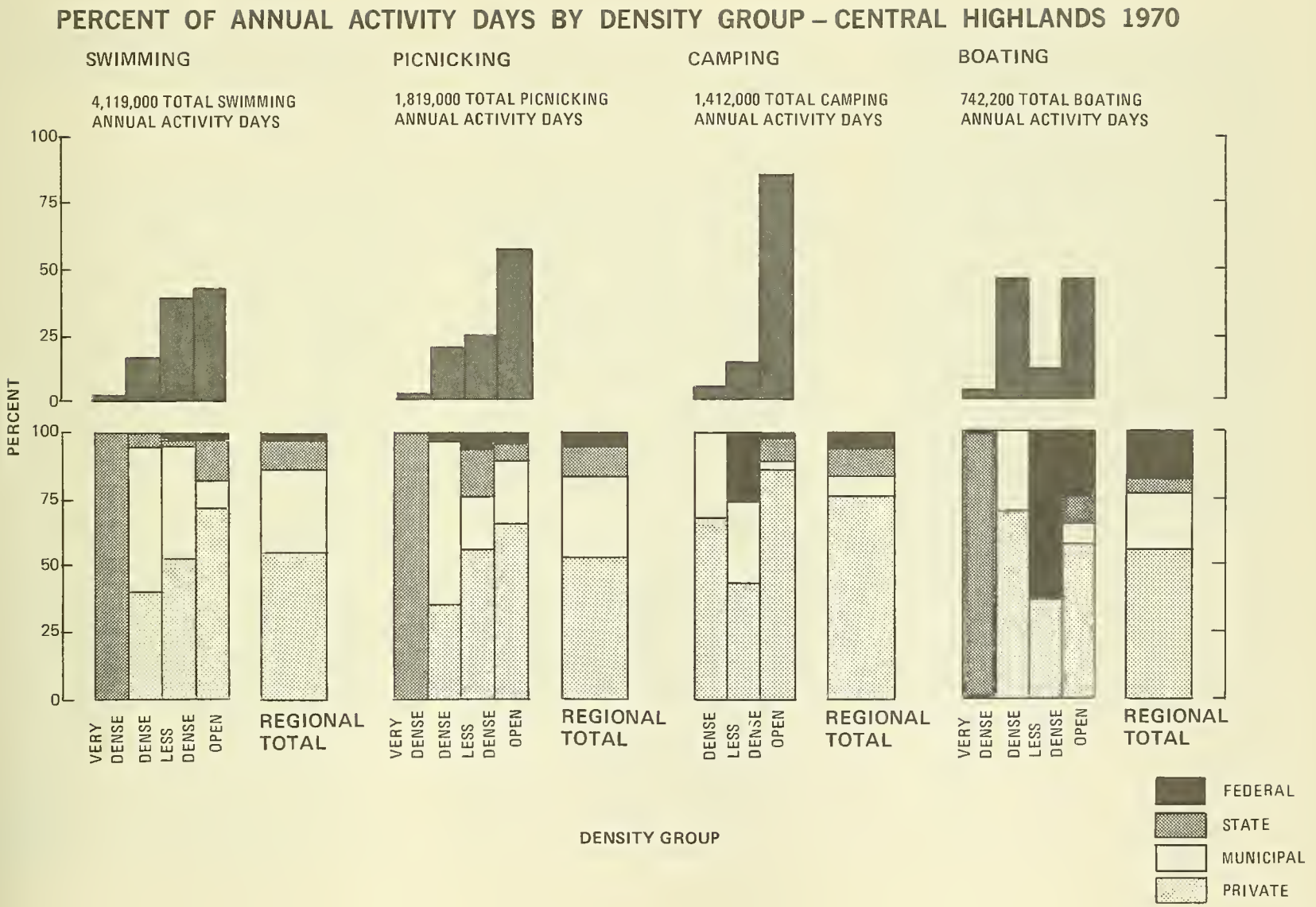
Fresh Water	Salt Water
A. Quality	A. Quality
B. Quality	B. Quality
C. Quality	C. Quality
D. Quality	

Legend-Existing

Fresh Water	Salt Water
Meets Stds.	Meets Stds.
Approaching Stds.	Approaching Stds.
Below Stds.	Below Stds.

*SEE APPENDIX F

Figure VI-20


PERCENT OF ANNUAL ACTIVITY DAYS BY DENSITY GROUP – CENTRAL HIGHLANDS 1970
SWIMMING
4,119,000 TOTAL SWIMMING ANNUAL ACTIVITY DAYS
PICNICKING
1,819,000 TOTAL PICNICKING ANNUAL ACTIVITY DAYS
CAMPING
1,412,000 TOTAL CAMPING ANNUAL ACTIVITY DAYS
BOATING
742,200 TOTAL BOATING ANNUAL ACTIVITY DAYS
PERCENT
100
75
50
25
0
VERY DENSE
DENSE
LESS DENSE
OPEN
REGIONAL TOTAL
DENSITY GROUP
FEDERAL
STATE
MUNICIPAL
PRIVATE

the Region and the percentage distribution of recreational facilities by ownership category for each population density group. The total annual activity days for each activity is also listed.
The graphs reveal the following trends:

Although the state owns more than half the land (see table VI-10), the private sector supplies most facilities for the four major activities.

Most of the facilities for swimming, camping and picnicking are provided in the *open* and *less dense* areas.

There are several reasons for the difference between the percent of recreation acres owned and the percent of facilities supplied by ownership categories. The private sector often must develop land intensively for a profitable return on its investment. The holdings of state lands are diverse and represent many purposes other than the provision of recreation facilities. The Metropolitan District Commission has extensive watershed lands in the Region and there are a number of wildlife management areas controlled by the Division of Fisheries and Game. Department of Natural Resources lands are predominantly of a rugged, upland character v- suited for intensive recreational development and thus are managed for wildlife, forestry or conservation purposes.

Because of inventory data problems, the supply of facilities is understated in the *very dense* area of the Region.

Potential Resources

The 1970 Outdoor Recreation and Open Space Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher education institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools, colleges and seminaries. Statewide these lands total 206,619 acres, with 21% in the Central Highlands as shown in table VI-11.

While many of these lands will not be available in the near future, they do represent a reserve of open lands with a major recreational potential. Consistent with the trends already noted in the distribution of facilities and open space acreage, these non-recreational acres are mostly located in the *open* areas.

Table VI-11

Potential Recreation Acres by Density Group and Ownership Category, 1970.
Central Highlands Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	—	—	—	—	—	
Very Dense	11,402	26%	6,233	4,905	264	—
Dense	9,279	22%	2,267	5,087	1,925	—
Less Dense	9,372	22%	1,689	7,115	568	—
Open	12,982	30%	7,569	2,506	2,907	—
Regional Total:	43,035	100%	17,758	19,613	5,664	—

DEMAND-NEEDS

Lands

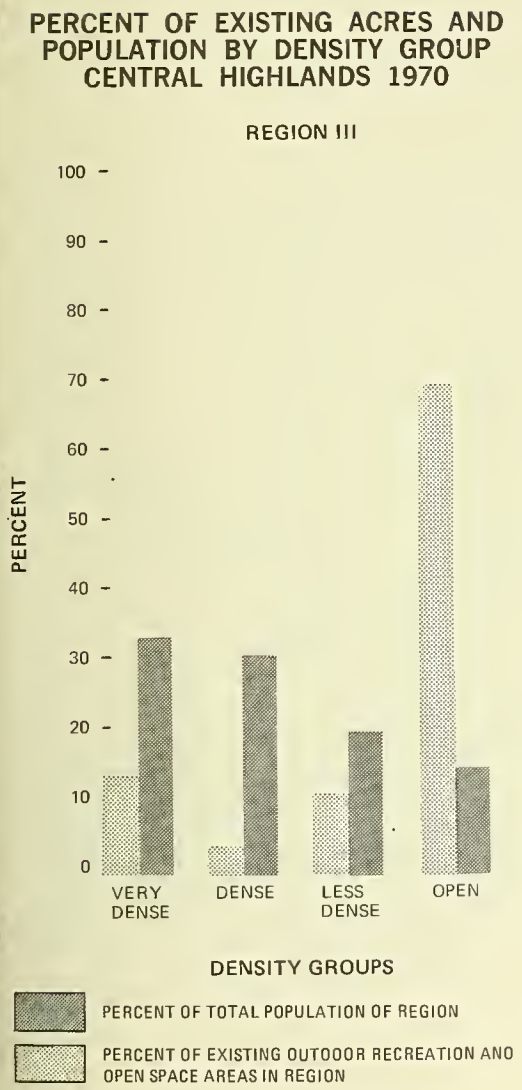
Figure VI-21 demonstrates the inverse relationship between the location of recreational lands and population density in the Central Highlands. However, based on 1970 population figures there appear to be sufficient recreation lands in each of the population density groupings if those available are of the appropriate type and quality. As yet open-space standards have not been adopted for Massachusetts, although nationally it is generally accepted that the minimum is 10-15 acres/1000 population in urban areas *(very dense* and *extremely dense).*

There are 124 acres/1000 population for the *very dense* group, 41 acres/1000 population for the *dense* group, 187 acres/1000 population for the *less dense* group, and 1321 acres/1000 population for the *open* group.

Although there are sufficient recreation lands by this measure, there are several situations that would justify new acquisitions.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by regional figures. Facilities and lands to serve local residents may well be needed, particularly neighborhood parks and day-use facilities.
b. New acquisitions may be required to keep pace with population increases and new residential developments.
c. Many diverse types of recreation land were included in the inventory of recreation areas. Although a region may have enough total acreage, it may still be lacking in lands suitable for certain facilities and activities. In the Central Highlands there is a shortage of swim-

Figure VI-21



ming, camping and boating opportunities; thus new acquisitions may be needed to meet specific shortages if suitable public lands are not available and private facilities do not fill the gap.

d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.
e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.
f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue.

Facilities

The relationship between the supply of facilities for swimming, picnicking, camping and boating and the demand for them is shown in table VI-12.

This table generally reveals an inverse relationship between the recreation demand and the supply of facilities for the four activities. Recreation facilities are largely located in the *less dense* and *open* areas though the demand for recreation is concentrated in the *dense* and *very dense* areas. Camping is the activity that shows the greatest imbalance in its distribution, but this inverse relationship is to be expected because camping is an activity which is enhanced by its away-from-home aspect. On the other hand, swimming is considered to be an activity participated in at a local level. Ideally, swimming facilities should be within walking or bike riding distance from home. Thus table VI-12 suggests that swimming facilities are maldistributed. Except in the *very dense* area, picnicking and boating facilities generally follow population distribution patterns.

Specific surpluses or deficits cannot be implied by the percentage imbalances between the supply and demand. These percentages act as indicators suggesting locations for future facilities. A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the Statewide Needs chapter.

In figure VI-22 the relationship between supply, demand and needs for the four activities at the present and for 1985 and 2000 is shown. Swimming shows both the greatest increase in demand and the greatest need, with approximately twice as many facilities needed as are currently available. This implies that existing public and private programs providing swimming facilities will have to be greatly expanded if these needs are to be met.

Picnicking, camping and boating show a similar pattern in their needs, although in terms of annual activity days the magnitude is significantly lower. However, the percentage relationship between the existing supply and projected needs is higher for picnicking, camping and boating than it is for swimming.

It is recognized that needs for other activities exist. However, at present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs chapter. It is probably safe to assume that present and projected needs for these activities show a similar pattern to the four activities.

NEEDS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – CENTRAL HIGHLANDS

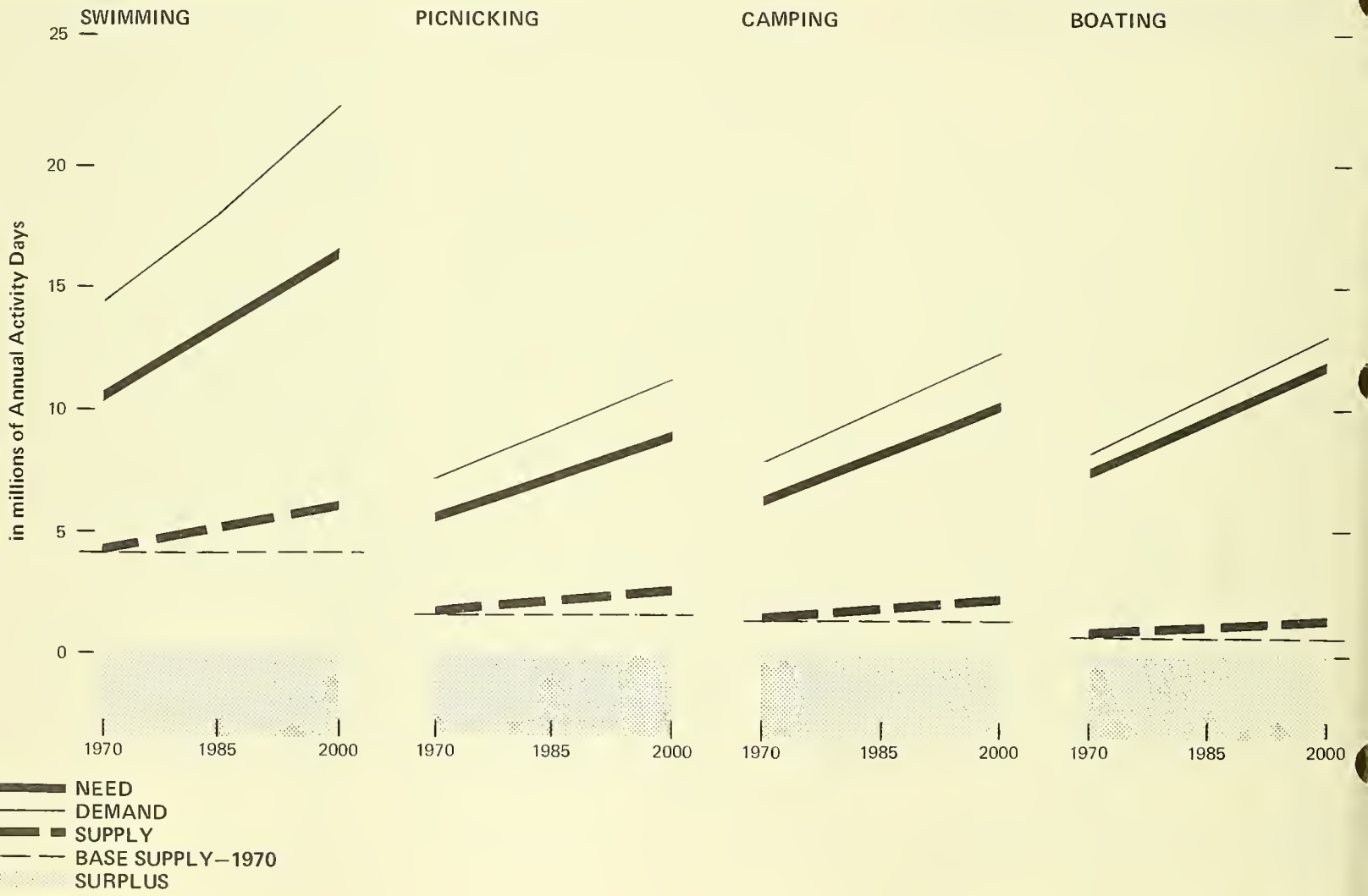


Table VI-12
Supply and Demand by Density Group for Four Activities, 1970
Central Highlands Region

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	—	—	—	—	—
Very Dense	2%	1%	—	2%	34%
Dense	16%	18%	4%	44%	31%
Less Dense	40%	25%	13%	10%	19%
Open	42%	56%	83%	44%	16%
Regional Total:	100%	100%	100%	100%	100%

REGIONAL PLANNING AGENCY RECOMMENDATIONS

Two regional planning agencies provide planning services for the Central Highlands and both have done open-space and/or recreation reports. The Montachusett Regional Planning Commission in Fitchburg has proposed a *Regional Open Space Planning Project,* (1970) which establishes an open-space planning program and presents preliminary goals and objectives. The Central Massachusetts Regional Planning Commission published *Open Space and Recreation* in 1967, followed by the *Regional Open Space and Recreation Plan* in 1972. These two reports have been reviewed to determine recommendations relevant to the framework of this Plan. Major recommendations contained in these plans are listed below. They are consistent with the Plan and thus are incorporated as part of the SCORP recommendations for this Region. Since they came from several sources the recommendations have sometimes been restated to standardize the presentation format.

1. Guidelines for quantitative recreation and open-space standards should be developed.
2. Green areas should be utilized to structure urban forms for the present and the future, delineate neighborhoods and give identity to the urban community.
3. A region-wide system of major recreation areas should be developed.
4. New facilities required for a particular activity should be located adjacent to existing or other proposed facilities rather than by themselves. Maximum clustering of activities in multi-purpose areas should be attempted.
5. All parts of the Region should be within a 25-minute drive of a major recreation area; urbanized sections should be within a ten-minute drive.

Priorities stated were:

1. For those communities where a regional open-space plan does not exist, the planning process should be initiated in order for communities to participate in federal funding programs.
2. Sites of a variety of size and character for a range of activities should be reserved for present and future use as early as possible.
3. Areas to be preserved:
   a. Those of highest value to the Region, such as shorelines, wetlands, ridge tops, scenic areas,
   b. new or enlarged sites for regional recreation ,
   c. new or enlarged regional conservation or low-intensity recreation areas for the future,
   d. flood control impoundments,
   e. water supply reservoir sites,
   f. miscellaneous minor tracts to fill gaps and regularize boundaries.

Region IV: Eastern Massachusetts

THE SETTING FOR RECREATION

General Characteristics

The Eastern Massachusetts Planning Region is bounded on the west by the Central Highlands Region, on the north by the state of New Hampshire, on the east by the Atlantic Ocean, and on the south by the Southeastern Massachusetts Region.

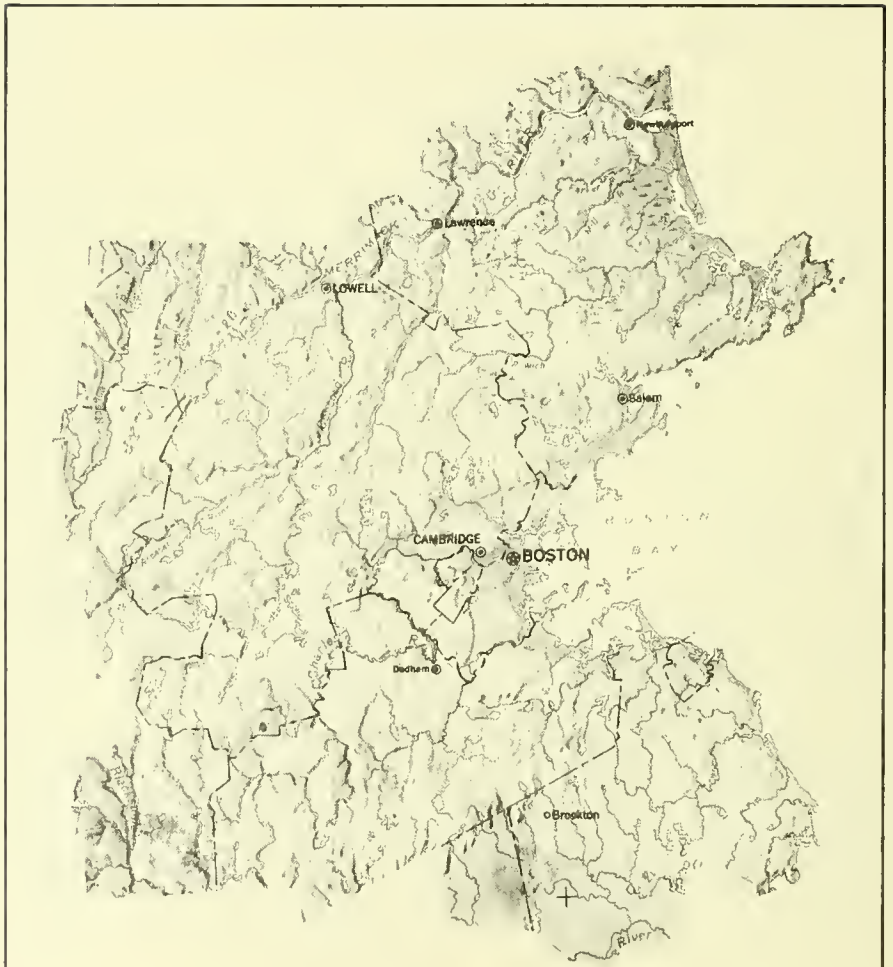
This Region is not a distinct physical unit; four physiographic subregions are located in the Eastern Massachusetts Region. The two largest are the Coastal Hills and the Boston Basin. The Coastal Hills region, largest subregion in Massachusetts, is a 200′-700′ plateau which slopes eastward from the more rugged Central Highlands to the lowlands of the Boston coastal area. The topography of the Coastal Hills is gently rolling, with the Blue Hills, a predominant landscape feature, traversing the southern edge. The Boston Basin, which has elevations ranging from sea level to 150 feet, is a distinctive physiographic feature in the Eastern Massachusetts Region. Ringed by a band of hills which form the border line with the Coastal Hills, the Basin is generally flat, interrupted primarily by more than 50 drumlins. Many institutions, hospitals, and schools have been constructed on top of these elliptical-shaped, glacially-deposited hills. Beacon Hill and Bunker Hill are two famous drumlins in the Boston area.

The two other physiographic subregions which make up the Region are the Coastal Lowlands and part of the Narragansett Basin. The Coastal Lowlands, situated in the North Shore area adjacent to the New Hampshire line, range in elevation from sea level to 200′. The Narragansett Basin, located in the southeast, is a lowland surrounded by the subregion of the Coastal Hills.

The Atlantic Ocean is the major water resource of

Figure VI-23

RELIEF MAP – EASTERN MASSACHUSETTS



the Eastern Massachusetts Region. Hundreds of miles of indented coastline and salt-marsh estuaries provide countless places for water-based recreation. To date, antiquated port facilities, neglected recreation areas, poor access, and polluted water in many harbors have contributed to underutilization of this vast resource. Between the land and sea are thousands of acres of coastal wetlands. These marshlands provide recreational opportunities such as bird-watching, fishing, hunting, clam digging and nature study. The irregular coastline along the north and south shores affords excellent opportunity for pleasure driving, bicycling, and swimming.

Major rivers include the Merrimack, which is fed by the Sudbury, Concord and Assabet; the Blackstone, which empties into Narragansett Bay; and the Charles, Mystic and Neponset which flow through the greater Boston area and empty directly into Boston Harbor. The Parker and Ipswich rivers combine to form a vast estuary that terminates at the southern end of Plum Island. In the 19th century the Middlesex Canal connected the manufacturing cities of Lowell and Lawrence on the Merrimack River with Boston.

In the Blackstone Valley the Blackstone Canal connected Worcester with Providence, Rhode Island. These canals, if restored, have a potential not only for swimming, boating and fishing, but also for outdoor education, a linear trail and interpretive history.

History and Culture

Eastern Massachusetts has numerous historic sites. Many of the towns and cities were incorporated in the late 17th century. Architecture of homes and public buildings, street patterns, graveyards and monuments reflect the early history of the Region. The National Historic Landmarks Program has designated 77 official sites in Eastern Massachusetts; 33 of these are in Boston.

Minuteman National Historic Park in Lexington and Concord, as well as hundreds of other historic sites, landmarks and buildings throughout the area, suggest the great latent potential for recreational-educational development based on both an urban setting and the Region's rich historical heritage. Undoubtedly the nation's Bicentennial, which will begin in 1975, will stimulate interest in the historical resources of Eastern Massachusetts.

The educational and cultural resources of the Region are renowned. Many institutions of higher learning are situated in the Region. Among the most famous are Harvard University, M.I.T., Tufts, Brandeis, Boston University, Northeastern University, and Boston College. Numerous smaller colleges, junior colleges and technical and business schools are located throughout the Region. The Museum of Fine Arts in Boston, one of the country's largest museums, has collections of works ranging from colonial American painters and craftsmen to European and Asiatic artists. Other significant museums include the Isabella Stewart Gardner Museum, the Fogg Museum at Harvard, the Institute of Contemporary Art, the Children's Museum and the Museum of Science.

Population

Eastern Massachusetts is the largest SCORP planning region with 3,769,400 inhabitants (66% of the state's population) and 2300 square miles (29% of the land and water area of the Commonwealth).

The most densely settled region in the state, Eastern Massachusetts has several cities with population densities as high as 20,000 people per square mile.

Eastern Massachusetts is also the most urban region in the state. Approximately 89.2% of the Eastern Massachusetts population lives in one of the four SMSA's (Standard Metropolitan Statistical Areas) in the Region. The major metropolitan areas are: Boston, which had a 1970 metropolitan population of 2,753,700; Lowell, which had a 1970 metropolitan population of 212,860; Lawrence-Haverhill which had a 1970 metropolitan population of 205,641; and Brockton which had a 1970 metropolitan population of 189,820.

This Region is the only SCORP planning region which has municipalities in the *extremely dense* category. In Eastern Massachusetts there are seven cities and towns out of a total of 152 which have population densities of more than 10,000 per square mile. Even though the Region is so densely settled, in 1970 there were 13 cities and towns, mostly located along the perimeter of the Region or away from major transportation routes, which had a small enough population to be classified as *open* (see figure VI-24 and table VI-13).

Table VI-13
Population and Land and Water Acres by Density Group, 1970
Eastern Massachusetts Region

Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	1,033,307	27%	4%
Very Dense	1,060,831	28%	9%
Dense	1,130,429	30%	31%
Less Dense	507,860	13%	46%
Open	36,973	2%	10%
Regional Total:	3,769,400	100%	100%

Transportation

The Eastern Massachusetts Region is the principal focus of major Massachusetts and New England transportation routes. Interstate highways, expressways and thousands of miles of business and collector streets cross the Region; two important railways, the Penn Central and the Boston and Maine, supply service to the area. Public transportation in the Boston metropolitan area is supplied primarily by the Massachusetts Bay Transportation Authority; subway lines and many on-surface buses and trolleys provide public transportation for Boston area residents. In other areas of the Region on-surface buses and trains are the major means of public transportation. In addition, Boston's Logan Airport is a busy facility which serves international air traffic as well as domestic commercial flights.

Recreation Potential

Even though highly urbanized, Eastern Massachusetts has outstanding recreational potential. Its diversity of physical, cultural and historic resources makes it possible to provide almost the complete spectrum of recreational opportunity.

The Atlantic Ocean and the vast historic-cultural resources provide an outstanding potential for recreation which cannot be duplicated by most other regions of the state.

A particularly exciting project - the development of the Boston Harbor Islands - is currently in the acquisition and planning stage under the direction of the Massachusetts Department of Natural Resources. This project represents an outstanding chance to develop a major water-oriented park facility near a large metropolitan area.

Because of its rich heritage, particularly that centering around Colonial and Revolutionary times, the Region can play a major role in the forthcoming Bicentennial Celebration commemorating the nation's 200th birthday.

Figure VI-24

POPULATION DENSITY EASTERN MASSACHUSETTS 1970

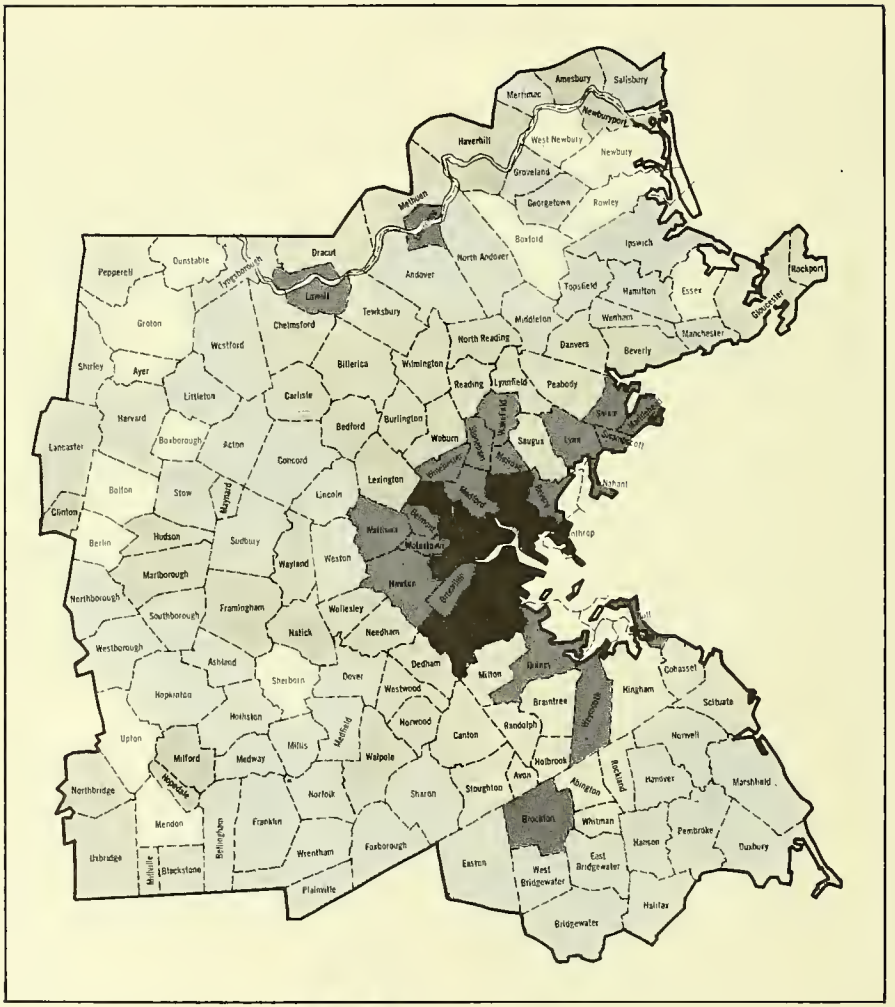


Figure VI-25

SELECTED RECREATION LANDS AND SITES EASTERN MASSACHUSETTS 1970

EASTERN MASSACHUSETTS REGION

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Ames Nowell	Abington	611
2.	Ashland	Ashland	470
3.	Bradley W. Palmer	Hamilton Ipswich Topsfield	721
4.	Cochituate	Framingham Natick Wayland	1,126
5.	Cushing Memorial	Scituate	7
6.	Standish Monument	Duxbury	29
7.	Plum Island	Ipswich	76
8.	Walden Pond	Concord Lincoln	117
9.	Wompatuck	Cohasset Hingham Norwell Scituate	2,748
10.	Hopkinton	Ashland Hopkinton	960
11.	Warren Manning	Billerica	40
12.	Whitehall	Hopkinton	877

State Forests

13.	Billerica	Billerica	335
14.	Blanchard Road	Andover	35
15.	Boxford	Boxford North Andover Middleton	740
16.	Bridgewater	Bridgewater	59
17.	Bristol-Blake	Norfolk	141

Name	Municipality	Acreage
18. Carlisle	Carlisle	58
19. F. Gilbert Hills	Foxboro Wrentham	832
20. Franklin	Franklin Wrentham	881
21. Georgetown-Rowley	Boxford Georgetown Ipswich Rowley	1,138
22. Harold Parker	Andover Boxford Georgetown Middleton North Andover North Reading Tewksbury	3,511
23. Lancaster	Lancaster	90
24. Lowell-Dracut	Lowell Dracut	796
25. Marlborough	Marlborough	60
26. Medfield	Medfield	37
27. Sudbury	Hudson Marlborough Stow	234
28. Upton	Hopedale Hopkinton Northbridge Upton	2,695
29. West Bridgewater	West Bridgewater	252
30. Willowdale	Ipswich Topsfield	2,075
31. Wrentham	Plainville Wrentham	993
State Reservation		
32. Salisbury Beach	Salisbury	520
Division of Fisheries & Game		
33. Crane Pond	Georgetown Groveland Newbury West Newbury	1,880
34. Westborough	Westborough	175
35. West Meadows	West Bridgewater	474
Metropolitan District Commission		
36. Breakheart Reservation	Saugus Wakefield	570
37. Blue Hills Reservation	Braintree Canton Milton Quincy Randolph	5,489
38. Charles River		
39. Middlesex Falls Reservation	Malden Medford Melrose Stoneham Winchester	2,060
40. Neponset River Reservation	Boston Canton Dedham Milton Westwood	937
41. Stony Brook Reservation	Boston	468
42. Havey Beach	Boston	15
43. Lynn Shore-Nahant Beach	Lynn Nahant Swampscott	97
44. George's Island	Boston	28
45. Nantasket Beach	Hull	94
46. Orient Heights Beach	Boston	47
47. Revere Beach	Revere	135
48. Winthrop Beach	Winthrop	55
49. Hemenway Pond	Canton Milton	271
50. Lovell Island	Boston	28
51. Leo J. Martin Golf Course	Weston	66
52. Ponkapoag Golf Course	Canton	155
53. Spot Pond Area	Medford Melrose Stoneham Malden	537
54. Franklin Park Zoo	Boston	89
U.S. Department of Defense: Army Corps of Engineers		
55. Fourth Cliff Reservation	Scituate	56
56. Fort Devens	Harvard Lancaster	2,500
57. West Hill	Mendon Northbridge Upton Uxbridge Wayland	514
Department of the Interior Bureau of Sport Fisheries and Wildlife		
58. Parker River National Wildlife Refuge	Ipswich Newbury Newburyport Rowley	6,417
59. Great Meadows National Wildlife Refuge	Bedford Billerica Carlisle Concord Lincoln Sudbury Wayland	2,518

Name	Municipality	Acreage
National Park Service		
60. Minuteman National Historic Park	Concord Lexington Lincoln	508
County Reservations		
91. Walden	Concord Lincoln	350
Trustees of Reservations		
61. Rocky Woods Reservation	Medfield	431
62. Charles Ward Reservation	Andover	375
63. Old Town Hill	Newbury	230
64. Stevens-Coolidge Farm	North Andover	89
65. Agassiz Rock	Manchester	106
66. Appleton Farm	Hamilton	92
67. Charles River Penninsula	Needham	29
68. Fork Factory Brook	Medfield	62
69. Medfield Rhododendrons	Medfield	109
70. Misery Islands	Salem	83
71. Mt. Ann Park	Gloucester	87
72. Noon Hill	Medfield	52
73. Norris	Norwell	99
74. Pegan Hill	Dover Natick	31
75. Crane Reservation	Ipswich	1,326
76. Rocky Narrows	Sherborn	53
77. Henry L. Shattuck	Medfield	200
78. Weir Hill	North Andover	177
79. Whitney and Thayer Woods	Cohasset Hingham	795
80. World's End	Hingham	249
Massachusetts Audubon Society		
81. Broadmoor	Natick	175
82. Drumlin Farm	Lincoln	220
83. Eastern Point	Gloucester	26
84. Highland Farm	Belmont	45
85. Ipswich River	Hamilton Topsfield Wenham	2,300
86. Little Pond	Sherborn	262
87. Moose Hill	Sharon	227
88. Waseeka	Holliston Hopkinton	140
89. Straitsmouth Island	Rockport	33
90. Marblehead Neck	Marblehead	15

SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open Space Inventory are shown in figure VI-25. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. In the Eastern Massachusetts Region a total of 173,325 recreation acres were identified. Analysis by ownership class and population density group is shown in table VI-14.

The bulk of these lands 73% are located in the *dense* and *less dense* areas. These lands are distributed more evenly among the several ownership classes than in any of the other SCORP planning regions.

Water Resources

There are an estimated 444 great ponds and impoundments in Eastern Massachusetts containing approximately 30,683 acres of surface water. Major rivers in the region include the Nashua, Merrimack, Charles and Neponset. The Atlantic Ocean, in addition to being Massachusetts' gateway to the world, has a valuable commercial fishery which depends upon the associated estuaries and salt marshes of the Region. The coastal wetlands provide important wildlife habitats within the urbanized area. Boston, with its harbor and islands, potentially has one of the most beautiful settings of any American city.

Together these water resources offer a vast opportunity for swimming, boating and other water-based recreation. Unfortunately, these resources cannot be utilized to their fullest because of such problems as poor or restricted access and pollution which prohibits or discourages certain uses. Figure VI-26 shows both proposed water quality standards and existing conditions.

Through emphasis on pollution abatement and control, such as the current and planned programs for Boston Harbor and the Charles River, the utility of these water resources can be greatly increased.

Facilities

Recreation facilities for the four major activities - picnicking, swimming, camping and boating - were inventoried to determine the regional supply of these facilities. The eight graphs in figure VI-27 summarize the percentage of annual activity days by density group for the Region, and the percentage distribution of recreational facilities by ownership category for each population density group. The total annual activity days for each major recreation activity is also listed. The following trends are revealed by the graphs.

As with recreation and open-space acres, the majority of facilities are located in the *dense* and *less dense* population areas.

Even though recreation acres are fairly evenly distributed among the ownership classes, the private and municipal sectors are the largest providers of recreation facilities. The state plays an important role in one or more density groups for each activity.

There are several reasons for the difference between the percent of recreation acres owned and the percent of facilities supplied by ownership categories. The private sector, excluding the quasi-public organizations, often must develop land intensively for a profitable return on its investment. On the other hand, state and federal lands reflect the role their agencies play in overall resource management and conservation. On many of these lands, recreation is a by-product, or one of several "multiple uses."

Potential Resources

The 1970 Outdoor Recreation and Open Space

Table VI-14

Existing Recreation Acres by Density Group and Ownership Category, 1970
Eastern Massachusetts Region

	Total		Ownership Category							
			Private		Municipal		State		Federal	
Density Group	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	5,665	3%	129	2%	2,814	50%	2,722	48%	—	—
Very Dense	25,830	15%	3,851	15%	14,451	56%	7,523	29%	5	—
Dense	54,255	31%	10,504	19%	16,582	31%	15,100	28%	12,069	22%
Less Dense	72,307	42%	28,351	39%	16,955	24%	20,246	28%	6,755	9%
Open	15,268	9%	3,725	24%	2,262	15%	4,826	32%	4,455	29%
Regional Total:	173,325	100%	46,560	27%	53,064	30%	50,417	28%	23,284	15%

Figure VI-26

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS EASTERN MASSACHUSETTS 1971

Legend-Proposed

Fresh Water	Salt Water
..... A. Quality	A. Quality
——— B. Quality	B. Quality
- - - C. Quality	C. Quality
——— D. Quality	

Legend-Existing

Fresh Water	Salt Water
——— Meets Stds.	Meets Stds.
- - - Approaching Stds.	Approaching Stds.
——— Below Stds.	Below Stds.

*SEE APPENDIX F

Figure VI-27

PERCENT OF ANNUAL ACTIVITY DAYS BY DENSITY GROUP – EASTERN MASSACHUSETTS 1970

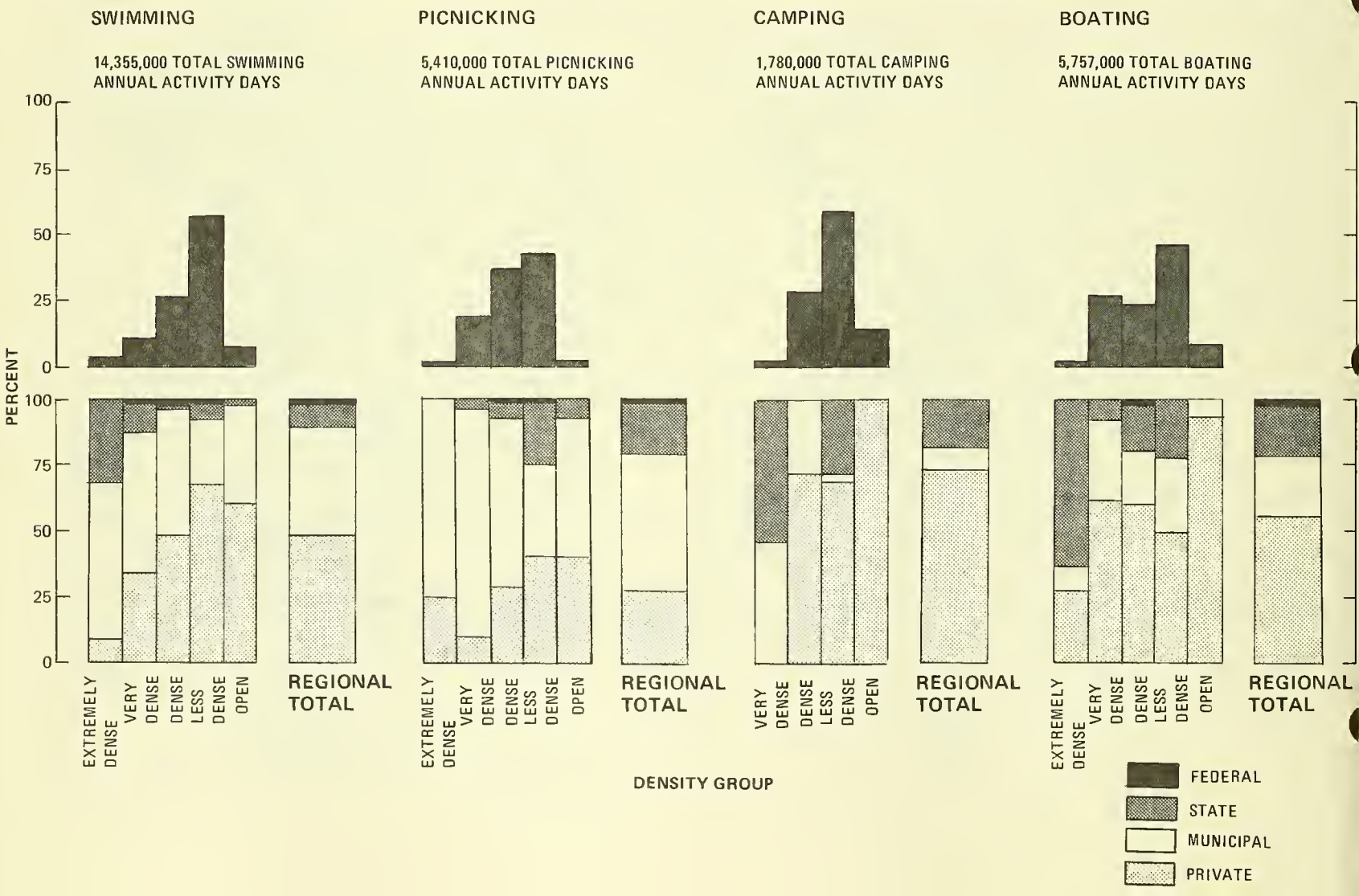


Table VI-15
Potential Recreation Acres by Density Group and Ownership Category, 1970
Eastern Massachusetts Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	604	1%	169	86	349	—
Very Dense	7,271	13%	1,539	4,904	666	162
Dense	19,108	34%	3,090	11,009	2,359	2,650
Less Dense	25,867	46%	7,592	8,011	7,510	2,754
Open	2,993	6%	1,746	544	703	—
Regional Total:	55,843	100%	14,136	24,554	11,587	5,566

Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher education institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools, colleges and seminaries. Statewide these lands total 206,619 acres, with 27% in Eastern Massachusetts.

While many of these lands may not be available in the near future, they do represent a reserve of open space with major recreation potential. Consistent with trends for existing recreation acres, these lands are located primarily in the *dense* and *less dense* population areas.

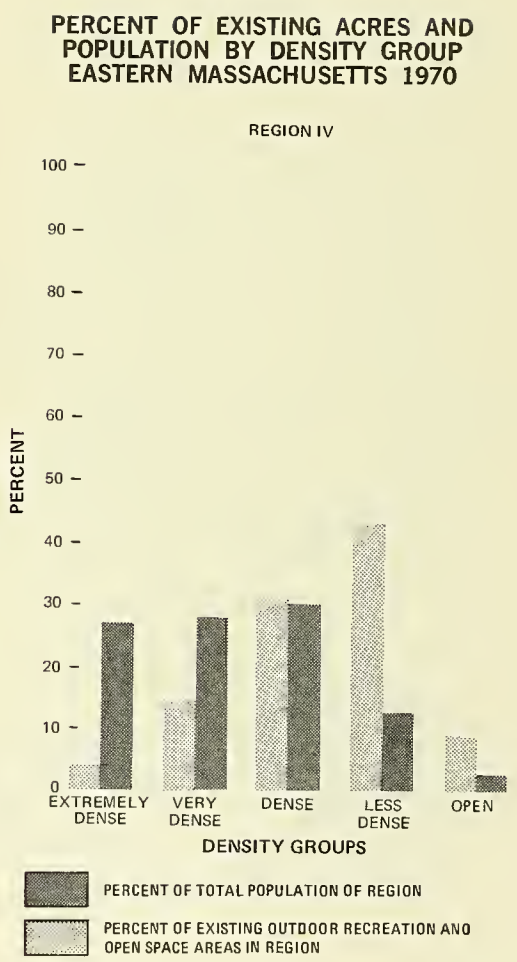
DEMAND-NEEDS

Lands

Figure VI-28 demonstrates the generally inverse relationship between the location of recreational lands and population density in Eastern Massachusetts. This is especially acute in *extremely dense* population areas which account for 27% of the Region's population, but which have only 3% of recreation land supplies. The *extremely dense* group has only five acres per 1000 population. Currently accepted national standards for city recreation acreage fall between 10-15 acres per 1000 population. Based on 1970 population levels, the *less dense* and *open* areas appear to have sufficient recreational acreage (142 and 413 acres per 1000 population respectively).

The *very dense* and *dense* areas contain 24 and 48 acres per 1000 population respectively and are thus inherently better supplied than *extremely dense* areas. However, the inventory did not evaluate the utility, function and quality of these lands; consequently they may not be as adequate as they appear.

Figure VI-28



Additional land acquisition is justified and should have high priority in *extremely dense* population areas. Further land acquisitions are also warranted in other population density areas and each potential acquisition project should be evaluated on its own merits.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by regional figures. Facilities and lands to serve local residents may well be needed, particularly neighborhood parks and water-oriented day-use facilities.
b. New acquisitions may be required to keep pace with population increases and new residential developments.
c. Many diverse types of recreation land were included in the inventory of recreation areas. Although a region may have enough total acreage, it may still be lacking in lands suitable for certain facilities and activities. This situation would be especially true in the *dense* and *less dense* population areas of the Region.
d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.
e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.
f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue.

Facilities

The relationship between the supply of facilities for swimming, picnicking, camping and boating and the demand for them is shown in table VI-16.

Table VI-16
Supply and Demand by Density Group for Four Activities, 197 Eastern Massachusetts

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	5%	6%	—	3%	27%
Very Dense	12%	19%	2%	24%	28%
Dense	25%	34%	27%	22%	30%
Less Dense	50%	38%	57%	44%	14%
Open	8%	3%	14%	7%	1%
Regional Total:	100%	100%	100%	100%	100%

This table generally reveals an inverse relationship between the recreation demand and the supply of facilities for the four activities. Recreation facilities are largely located in the *dense* and *less dense* areas. Camping is the activity that shows the greatest imbalance in its distribution, but this inverse relationship is to be expected because camping is an activity which is enhanced by its away-from-home travel aspect. On the other hand, swimming is considered to be an activity participated in at a local level. Ideally, swimming facilities should be within walking or bike riding distance from home, thus table VI-16 suggests that swimming facilities are maldistributed.

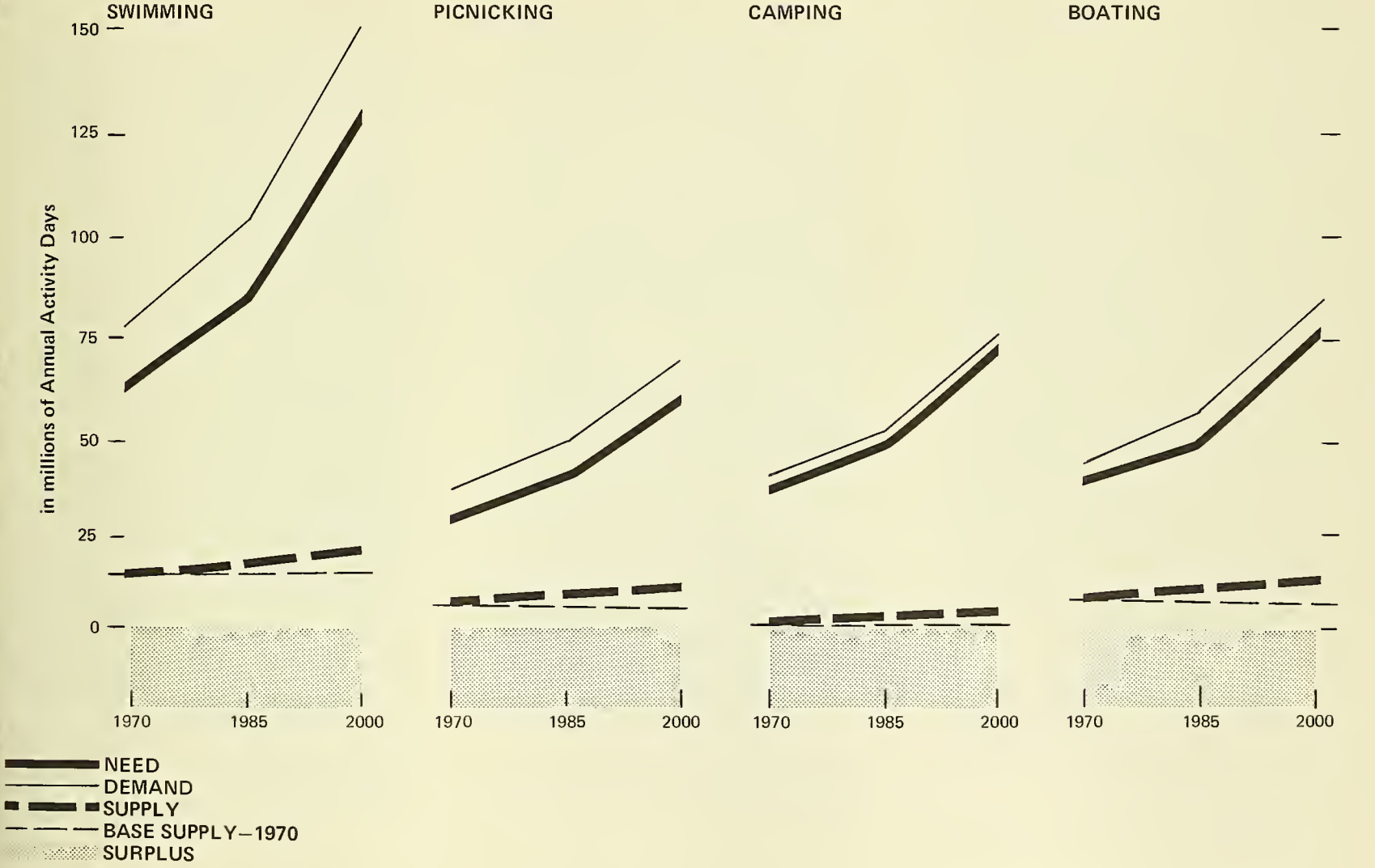
Specific surpluses or deficits cannot be implied by the percentage imbalances between the supply and demand. These percentages act as indicators suggesting locations for future facilities. A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the Statewide Needs chapter.

Figure VI-29 presents the relationship between supply, demand and needs for the four activities at the present and for 1985 and 2000. In terms of annual activity days, swimming facilities show the largest deficit, with about three times as many facilities needed as are currently available. By projecting current supply at a rate corresponding to current program levels, it becomes apparent that unmet swimming needs will increase greatly in the future. The implication is strong that existing public and private programs providing swimming will have to be greatly increased if these needs are to be met. The pattern for the other three activities is similar, although the need in activity days is not nearly as great. However, the percentage relationship between existing and needed facilities is greater for camping, boating and picnicking than for swimming.

It is recognized that other activity needs exist. However, at present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs Chapter. It is probably safe to assume that present and projected needs for these

Figure VI-29

NEEDS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – EASTERN MASSACHUSETTS



activities show a similar pattern to the four activities.

REGIONAL PLANNING AGENCY RECOMMENDATIONS

There are four regional planning agencies which serve the planning needs of cities and towns in the Eastern Massachusetts Planning Region. *The Metropolitan Area Planning Council* (MAPC), the largest regional planning agency in Massachusetts, has jurisdiction over 100 cities and towns in Eastern Massachusetts which contain over 82% of the Region's population. The *Merrimack Valley Regional Planning Commission* (MVRPC) Planning agency is located in the northeastern part of Eastern Massachusetts. The MVRPC Region contains 7% of the Eastern Massachusetts population in 15 towns and cities. The *Northern Middlesex Area Commission* (NMAC), which includes 6% of the Eastern Massachusetts population, is situated in the northwest. The fourth regional planning agency in the Eastern Massachusetts study area is the *Old Colony Planning Council* (OCPC). OCPC, which is located in the south, contains ten cities and towns and comprises 5% of the Region's population. Each of the four agencies has formulated open-space and recreation planning recommendations. Because of Eastern Massachusetts' great diversity of needs and interests these recommendations are presented individually for each regional planning agency, rather than being combined as for the other SCORP Regions.

In each case the plans have been reviewed to determine regional recommendations relevant to the framework of the Plan. Recommendations listed are consistent with this Plan and are thus incorporated as part of SCORP recommendations for the Eastern Massachusetts Region.

Metropolitan Area Planning Council

In April 1969 the Metropolitan Area Planning Council published a four-volume report entitled *Open Space and Recreation Plan and Program.* The following recommendations are from Volume 1, entitled *Open Space and Recreation Plan and Program for Metropolitan Boston.*

A. The following policies will help to achieve an adequate *quantity* of open space in the Boston metropolitan area:
   1. plan, acquire, develop, and operate at the metropolitan level recreation facilities designed for metropolitan-wide use.
   2. publicly acquire or control all major inland wetlands, banks of metropolitan rivers, and coastal wetlands and beaches to assure that all residents have a place to swim, boat, or fish and at the same time to protect our vital water resources.
   3. minimize the travel time and distance between the urban population and a diverse range of recreational facilities, thus ensuring maximum choice and opportunity.
   4. provide for multiple use of open-space areas wherever possible.
   5. create artificial facilities in resource-poor areas as an alternative way of meeting recreation or scenic needs and improving the character of the landscape.

B. The following policies will help to achieve an adequate *quality* of open space in the Boston metropolitan area:
   1. protect unique areas from urban development and strengthen those areas that are already a part of the existing open-space system accessible to the public.
   2. reclaim inland and coastal waters from pollution and provide for their continued purity in order to meet increasing recreation and utilitarian needs.
   3. provide landscape treatment for services and utilities necessary to an urban area so that they become complementary parts of the open-space system.
   4. design the metropolitan open-space system to the maximum extent possible to give form, structure and a sense of identity to the urban development that surrounds it.
   5. identify, protect and, where necessary, restore or rehabilitate historic buildings and areas to enhance their meaning and contribution to the quality and diversity of the area.

C. Other recommendations were:
   1. Complete network of independent trails for walking and bicycling should be built throughout the area, never more than 15-minutes' walk from any major residential area, and should come into the densely developed urban areas, making multiple use of existing rights-of-way wherever feasible, and connecting with local recreation areas and open space.
   2. significant acreage close to the metropolitan area must be kept open so that people can enjoy the natural environment.
   3. reservations should be easily accessible from major transportation systems; routes should be well marked. Public transportation should be provided wherever possible and consideration be given to seasonal service to particularly active centers. Foot and bicycle connections from the linear park system will give good access to nearby residential areas and other points of interest.
   4. artificial man-made facilities capable of providing diverse recreational opportunities must be substituted for natural facilities because of the scarcity of suitable open land.
   5. since nondrivers constitute a large percentage of total users, train facilities must be accessible by foot, bicycle, or public transportation.

Merrimack Valley Regional Planning Commission

The Merrimack Valley Regional Planning Commission published *Regional Land Use Plan* in September 1970. The following recommendations are from that report:

1. Publicly owned land, privately owned lands with few structures but large acreage requirements and low-density housing development should be coordinated in an open-space district. Public ownership in the open-space district should be increased to preserve wildlife and natural features and to satisfy such recreational needs as camping, hiking, nature study hunting, fishing, etc., requiring large tracts of land.
2. Shorelines should be acquired by the public to the maximum extent feasible. The natural resources of the Region's water bodies (rivers, ponds, great ponds and ocean beaches) should be reclaimed where necessary and managed and developed for public use and enjoyment.
3. Conservation commissions are urged to participate in a review of the open-space aspects of the *Regional and Land Use Plan* with their local planning boards. Together they should agree on local open-space goals which the conservation commission should convert to an acquisition program to be presented at town meetings.
4. Land should be acquired involving major natural features.
5. Future emphasis should be given to the development of riverfronts and hilltop vistas.

Northern Middlesex Area Commission

In 1970, the Northern Middlesex Area Commission published a report entitled *Open Space Recreation Plan Summary*. The following recommendations are set forth in that report.

1. Purchase is recommended for all areas where intensive public use is anticipated.
2. Easements are recommended to protect the natural amenities of the area or to allow limited or occasional public use.
3. Zoning regulations are recommended to provide limited amounts of open space with a neighborhood orientation.
4. Rights of access should be negotiated to enable use of power lines, rights-of-way and abandoned railroad beds for recreation routes for hiking, snowmobiles, riding, etc.
5. Conservation easements and rights of access along the banks of rivers and streams should be acquired to preserve the natural beauty, allow recreation paths and access for boating and fishing.
6. Practically all wetlands should become a part of the open-space system due to their importance in retaining water supply and minimizing flooding - local acquisition of conservation easements is recommended to insure aquifer areas and wildlife habitats.

Old Colony Planning Council

In June 1969 the OCPC published a report entitled *Open Space for the Old Colony Planning Council.* The following recommendations are set forth in that report:

1. Parks and recreation centers in the most urban parts of the region are needed.
2. The natural watershed area and wildlife sanctuary should be preserved and protected from pollution and development.

Region V: Southeastern Massachusetts

SETTING FOR RECREATION

General Characteristics

The Southeastern Massachusetts Planning Region extends from the southern border of the Eastern Massachusetts Region in the north to Buzzards Bay in the south; from Rhode Island in the west to Cape Cod Bay in the east. It covers most of Bristol and Plymouth counties. Characteristically, most of the Region is a low rolling plain with a few small hills along the eastern coastal section and around Fall River and the Attleboroughs. In these sections elevations range upward from 200 feet and approach 300 feet in a few areas. The major physiographic feature of the Region is Narragansett basin which was formed during the Carboniferous age some three hundred million years ago.

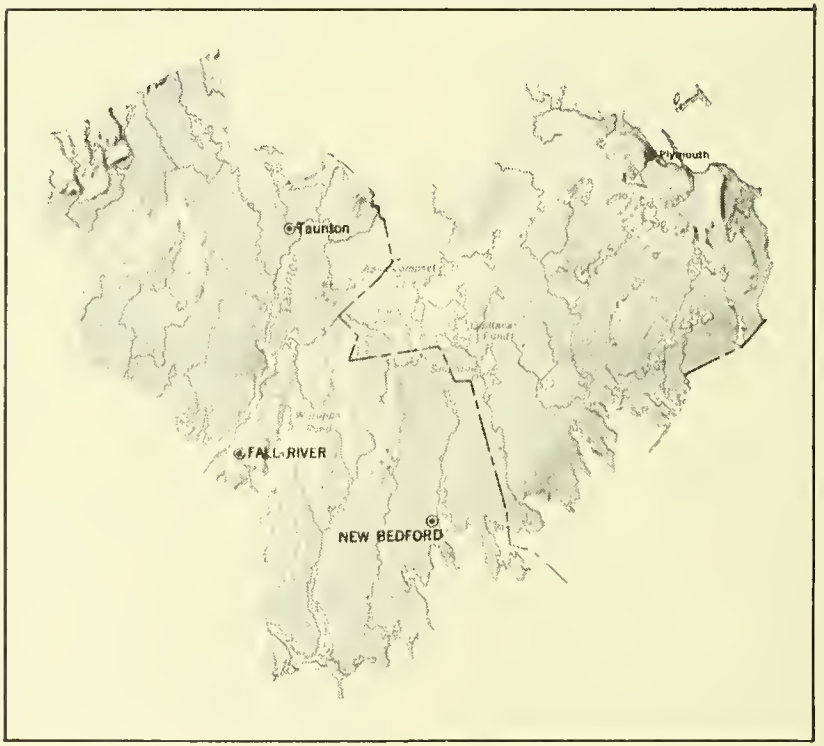
The Region's numerous ponds, bogs, extensive wetlands and small streams are the result of the land's drainage systems being disrupted by glaciation. Assawompset Pond (2656 acres) in Lakeville is the Commonwealth's largest natural pond. The Taunton River, the Region's largest stream, drains most of Narragansett basin, while the Ten Mile River forms part of the Rhode Island border. Smaller rivers, including the Westport, Acushnet, Wareham and Weweantic, flow south into broad estuaries with salt-marsh areas.

History and Culture

The date of original settlement in this Region is December 20, 1620 when the Pilgrims established their colony at Plymouth. The years of hardship and struggle are a well-known story. In 1685 the original colony was divided into Plymouth, Bristol and Barnstable counties. The new settlements grew and prospered.

Figure VI-30

RELIEF MAP – SOUTHEASTERN MASSACHUSETTS



As early as 1656 bog ore, found along the banks of streams, was being mined and smelted into iron. Through the years manufacturing has grown and diversified. The jewelry and shoemaking industries experienced the most spectacular growth and continue to be important today, along with the manufacture of food products, textiles, paper, electrical equipment and wearing apparel. The agricultural products of Southeastern Massachusetts include eggs, poultry and cranberries. Whaling, fishing and shipbuilding were other important early industries. The Region still derives much of its character from these maritime interests.

Southeastern Massachusetts has numerous sites of historic and cultural interest. Plymouth Rock, Mayflower II, and Plimoth Plantation are nationally known and are Massachusetts' prime tourist attractions. Historic homes abound and in New Bedford there is a famous whaling museum. Taunton and Attleborough also have significant historic museums. The U.S.S. Massachusetts, a World War II battleship berthed in Fall River, is a popular tourist attraction.

Population

Of the seven SCORP regions Southeastern Massachusetts is fourth in population size with 499,604 (8% of the state's total) and fifth in land and water area (about 900 square miles or 12% of the state's land). Of the Region's 29 municipalities four are cities. Fall River and New Bedford are in the *very dense* group, five communities are in the *dense* group, 13 are in the *less dense* group and ten are in the *open* category. (See figure VI-31 and Table VI-17).

Taunton (48 square miles) is Massachusetts' largest city in land area and Plymouth (103 square miles) is the largest town.

Figure VI-31

POPULATION DENSITY
SOUTHEASTERN MASSACHUSETTS 1970

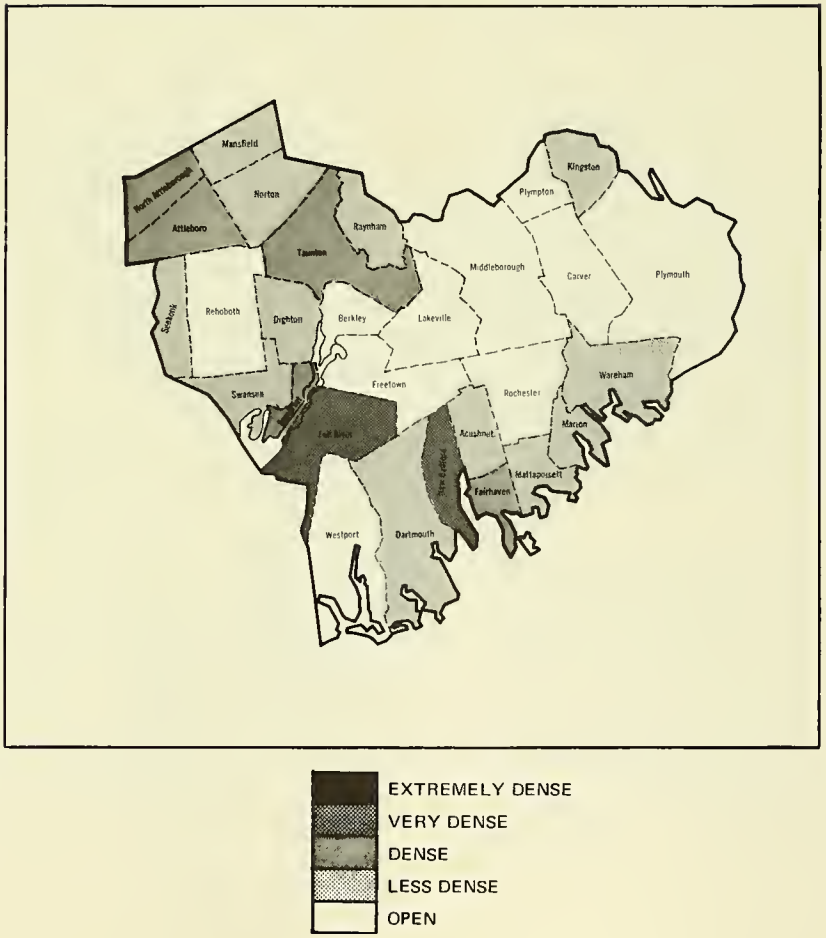


Table VI-17
Population and Land and Water Acres by Density Group, 1970
Southeastern Massachusetts Region

Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	—	—	—
Very Dense	198,675	40%	6%
Dense	129,748	26%	13%
Less Dense	106,578	21%	33%
Open	64,603	13%	18%
Regional Total:	499,604	100%	100%

Transportation

The highway network is well developed because the Region lies between Providence, Boston and Cape Cod. These areas, along with the Region's cities, are interconnected by high quality interstate roads. Southeastern Massachusetts' cities are also connected to each other, and to Boston and Providence, by rail. Taunton, New Bedford and Fall River have airports with smaller airfields at Mansfield and Plymouth.

Recreation Potential

Conveniently located between nationally known recreation attractions in Boston, Newport and Cape Cod, the Region is too often overlooked although it has many exceptional recreation features and attractions. Vast water resources are available, offering warm-water Atlantic Ocean beaches on the south shore and a multitude of ponds for swimming, boating and fishing. Many of the Region's freshwater ponds are still untouched but also unprotected. Extensive coastal wetlands provide opportunities for observing distinctive wildlife habitats. Many seacoast towns cater to the broad spectrum of saltwater recreation activities and sightseeing.

The Region also has extensive inland wetlands. Although not spectacularly scenic, these wetlands, associated woodlands and fields are being recognized for their exceptional ecological value. In New Bedford is Acushnet White Cedar Swamp, a unique 1800-acre vest-pocket wilderness lying within city limits and offering exceptional passive recreation opportunities for the city's 100,000 residents. The Region's wetlands represent an open-space potential that may accommodate low intensity uses such as hunting, fishing, nature study, hiking and bicycling.

In comparison with other regions in the state, the climate of Southeastern Massachusetts is moderate. Mild winters, longer spring and fall seasons favor many outdoor activities. From year to year the snow cover fluctuates; nevertheless these are fine areas for ski-touring and snowmobiling.

SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open-Space Inventory are shown in figure VI-32. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. The Southeastern Massachusetts Region has a total of 39,649 acres of recreation and open-space land. Analysis by ownership class and population density group is shown in table VI-18.

Like the other SCORP regions the recreational acres are not evenly distributed. Over 80% of the land is found in communities of *less dense* and *open* population while the more urbanized areas are not as well supplied with open-space and recreation lands. The state plays a substantial role in providing these lands.

Table VI-18

Existing Recreation Acres by Density Group and Ownership Category, 1970
Southeastern Massachusetts Region

Density Group	Total		Ownership Category							
			Private		Municipal		State		Federal	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	—	—	—	—	—	—	—	—	—	—
Very Dense	8,562	8%	375	10%	1,094	31%	2,093	59%	—	—
Dense	4,336	11%	1,109	26%	2,100	48%	1,127	26%	—	—
Less Dense	7,566	20%	4,986	66%	2,210	29%	370	5%	—	—
Open	24,185	61%	4,560	19%	1,917	8%	17,708	73%	—	—
Regional Total:	39,649	100%	11,030	29%	7,321	17%	21,298	54%	—	—

SOUTHEASTERN MASSACHUSETTS REGION

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Dighton Rock	Berkley	94
2.	Lloyd Memorial	Dartmouth	222
3.	Massasoit	Lakeville Taunton	1,085
4.	Watson Pond	Taunton	7

State Forests

5.	Berkley	Berkley	6
6.	Carver	Carver	5
7.	Freetown	Freetown	3,367
8.	Freetown-Fall River	Fall River	2,093
9.	Kingston	Kingston	130
10.	Myles Standish	Carver Plymouth	12,461
11.	Raynham	Raynham	16
12.	Rehoboth	Rehoboth	152

State Reservations

13.	Fort Phoenix Beach	Fairhaven	23
14.	Horseneck Beach	Westport	

Division of Fisheries and Game

15.	Rocky Gutter	Middleborough	1,541
16.	Ram Island	Mattapoisett	2

Trustees of Reservations

17.	Holmes Reservation	Plymouth	26

Massachusetts Audubon Society

18.	Great Neck	Wareham	147

Figure VI-32

SELECTED RECREATION LANDS AND SITES SOUTHEASTERN MASSACHUSETTS 1970

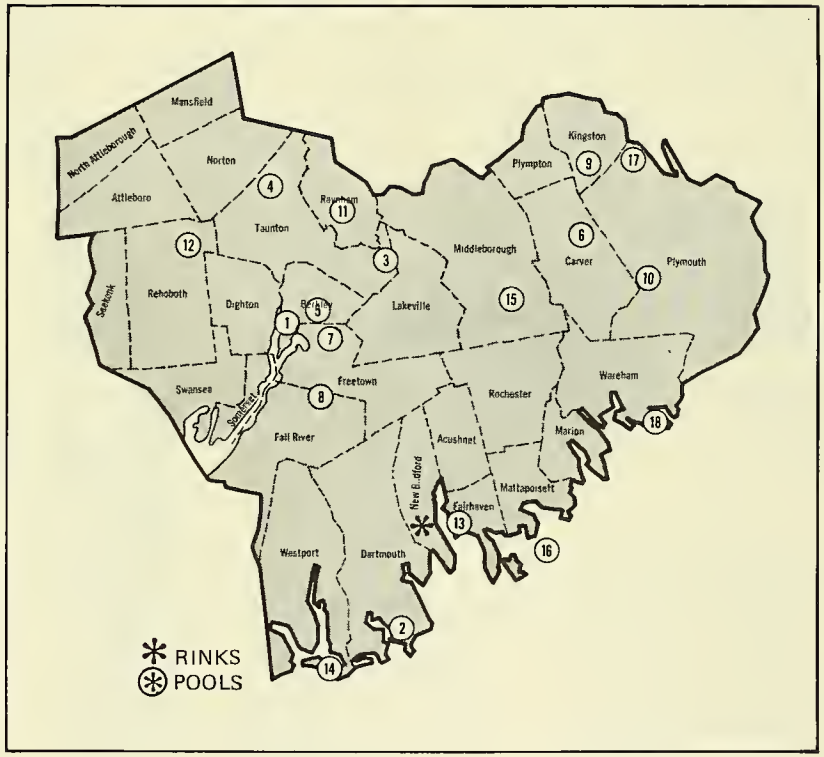


Figure VI-34

PERCENT OF ANNUAL ACTIVITY DAYS BY DENSITY GROUP – SOUTHEASTERN MASSACHUSETTS 1970

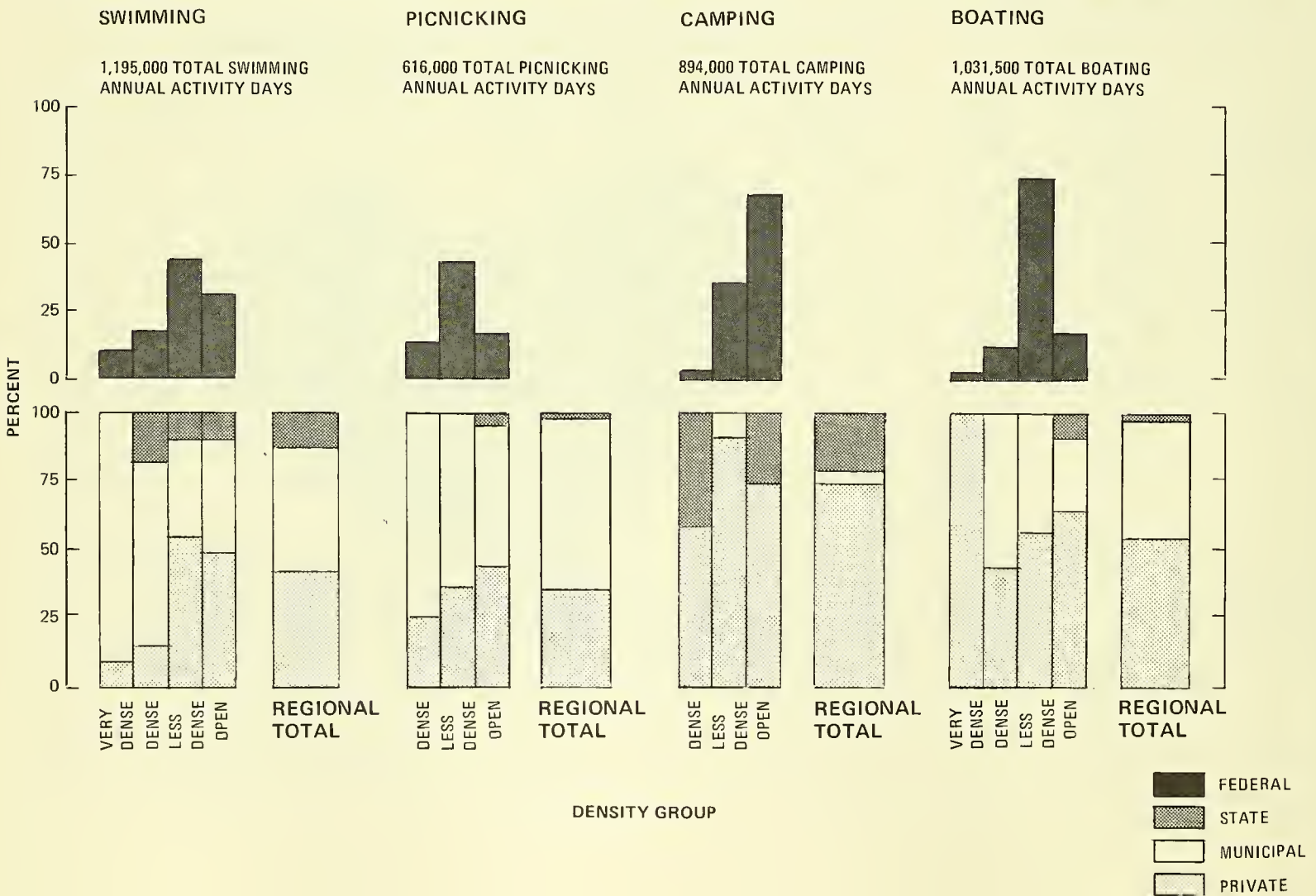


Figure VI-33

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS SOUTHEASTERN MASSACHUSETTS 1971

Legend-Proposed

Fresh Water	Salt Water
..... A. Quality	A. Quality
——— B. Quality	B. Quality
- - - C. Quality	C. Quality
——— D. Quality	

Legend-Existing

Fresh Water	Salt Water
——— Meets Stds.	Meets Stds.
- - - Approaching Stds.	Approaching Stds.
——— Below Stds.	Below Stds.

*SEE APPENDIX F

Water Resources

There are an estimated 193 impoundments and great ponds (natural water bodies over ten acres) with a total surface area of 20,370 acres representing 3.5% of the acreage in the Southeastern Massachusetts Region. In addition there is the long, irregular Atlantic coastline in the south which has exceptional warm-water opportunities; the shoreline along Cape Cod Bay has colder water. Compared to the other regions Southeastern Massachusetts is exceptionally well endowed with both fresh and salt-water resources. For various reasons many of these water bodies lack public access and are consequently unavailable for swimming, boating or other water-based recreation activities.

The Region's major rivers - the Ten Mile, Taunton and Acushnet - have pollution problems which limit recreational enjoyment. The reclamation of these rivers, plus improved access, would greatly enhance the Region's recreational opportunities. The two maps in figure VI-33 show existing water qualities in the major streams and standards proposed by the Massachusetts Water Resources Commission's Division of Water Pollution Control.

Facilities

Recreational facilities for the four major activities - picnicking, swimming, camping and boating - were inventoried to determine the supply. The eight graphs in figure VI-34 summarize the percentage of annual activity days by density group for the Region and the percentage distribution of recreational facilities by ownership category for each population density group. The total supply of annual activity days for each activity is also noted.

The following trends are revealed in the graphs:

The private and municipal sectors are supplying the bulk of the recreation facilities, although table VI-18 indicates that 58% of the open-space recreation acreage was supplied by the state.

As with recreation and open-space acreage, most of the facilities are in the *less dense* and *open* population areas.

The substantial percentage of recreational facilities being supplied by the private sector on a comparatively small percentage of the land probably represents the need for commercial interests to often intensively develop land in order to return a profit on its investment. The state, on the other hand, tends to own large holdings in remote, less densely populated areas for multiple purposes. The state's major holdings in the Region are managed for forests and wildlife purposes.

Potential Resources

The 1970 Outdoor Recreation and Open Space Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher education institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools, colleges and seminaries. Statewide these lands total 206,619 acres with 9% of these lands located in the Southeastern Massachusetts Region. While many of these lands will not be available in the near future, they do represent a reserve of open lands with a major recreational potential. Interestingly, the largest percentages of these potential lands are located in the *very dense* and *open* population groups.

DEMAND -NEEDS

Lands

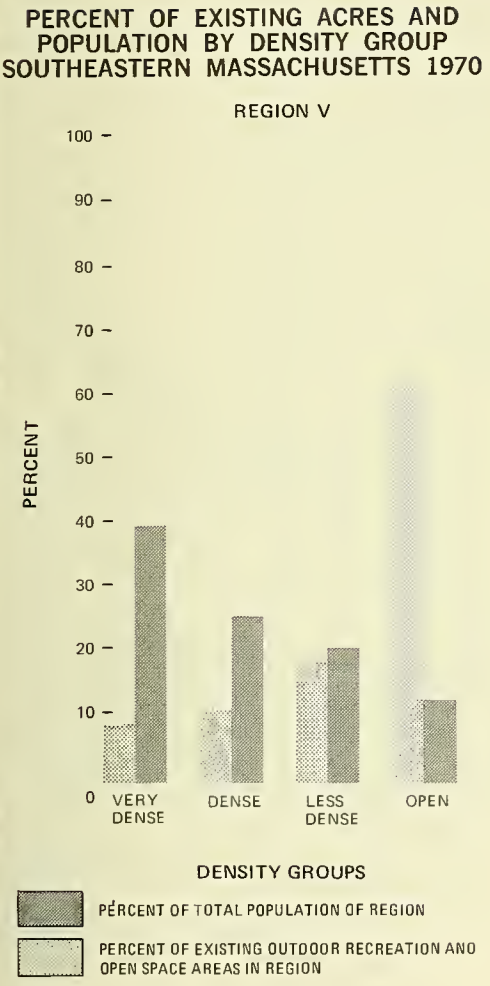
The inverse relationship between the location of recreation lands and population density in the Southeastern Massachusetts Region is clearly shown in figure VI-35.

Based on 1970 population figures there appear to be sufficient recreation lands in each of the population density groups if these lands are of the appro-

Table VI-19
Potential Recreation Acres by Density Group and Ownership Category, 1970
Southeastern Massachusetts Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	—	—	—	—	—	—
Very Dense	7,219	38%	1,920	5,178	121	—
Dense	2,927	16%	311	527	1,824	265
Less Dense	3,340	18%	758	1,501	1,081	—
Open	5,273	28%	2	5,174	90	7
Regional Total:	18,759	100%	2,991	12,380	3,116	272

Figure VI-35



priate type and quality. Open-space standards have not yet been adopted for Massachusetts, although nationally it is generally accepted that the minimum is 10-15 acres per 1000 population in urban areas (*very dense* and *extremely dense*). There are 48 acres/1000 population for the *very dense* group, 33 acres/1000 population for the *dense* group, 71 acres/1000 population for the *less dense* group and 372/1000 population for the *open* group. Compared to other regions, the Southeastern Massachusetts Region has the least acres per 1000 population in the *dense*, *less dense* and *open* categories.

In spite of the apparent adequacy of supply there are several situations that would justify new land acquisitions.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by regional figures. Facilities and lands to serve local residents may well be needed, particularly neighborhood parks and water-based day-use facilities.
b. As the population increases in this rapidly growing Region, the need for recreation land intensifies; therefore additional acquisitions may be justified in certain areas based on projected population increments. This would be especially true in the *very dense* and *dense* areas.
c. Many diverse types of recreation land were included in the inventory of recreation areas. Although a region may have enough total acreage, it may still be lacking in lands suitable for certain facilities and activities. In the Southeastern Massachusetts Region there is a shortage of swimming, picnicking, camping and boating opportunities; thus new acquisitions may be aimed to meet specific shortages if suitable public lands are not available and private facilities do not fill the gap.
d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.
e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.
f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue.

Facilities

The relationship between the supply for swimming, picnicking, camping and boating and the recreational demand is shown in table VI-20.

The demand for activities and the supply of facilities do not coincide. Most recreation facilities are located in *less dense* and *open* areas while the significant proportion of the demand is found in the *very dense* and *dense* groups. These percentage imbalances between the supply and demand do not imply specific surpluses or deficits; on the contrary, they act as indicators. It is important to note that there is an inverse relationship between supply and demand, particularly in camping. It is not expected that camping will be located in the *dense* and *very dense* population areas because camping is a recreation experience that is enhanced by the away-from-home travel aspect and by open spaces. Swimming, on the other hand, is an activity that should have a high rate of participation in local areas where, ideally, facilities would be located within walking or bike-riding distance of home.

Figure VI-36

NEEDS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – SOUTHEASTERN MASSACHUSET

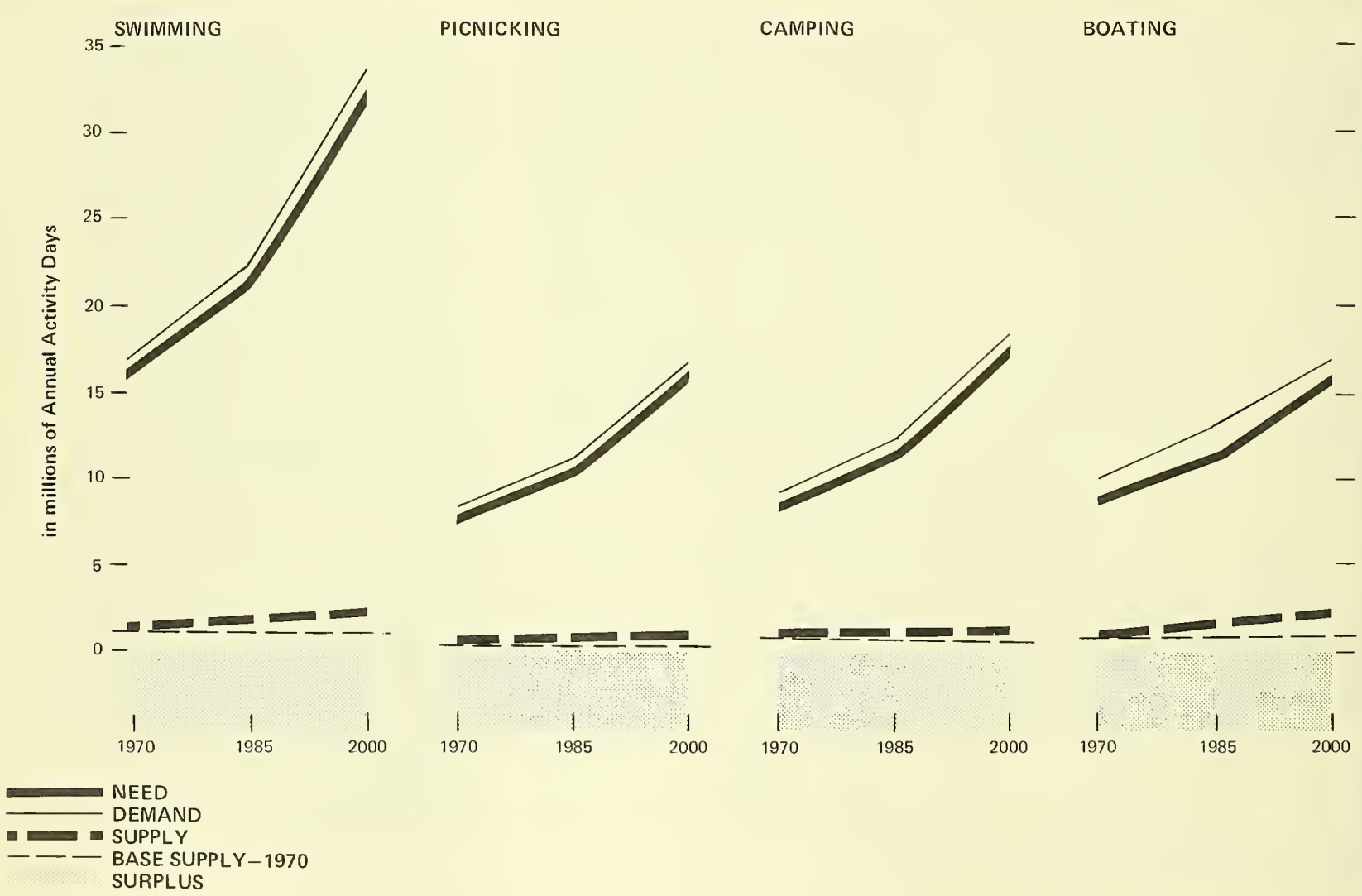


Table VI-20
Supply and Demand by Density Group for Four Activities, 1970
Southeastern Massachusetts Region

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	—	—	—	—	—
Very Dense	9%	—	—	1%	40%
Dense	16%	15%	2%	11%	26%
Less Dense	43%	57%	34%	72%	21%
Open	32%	28%	64%	16%	13%
Regional Total:	100%	100%	100%	100%	100%

A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the Statewide Needs chapter.

Figure VI-36 presents the relationship between supply, demand and needs for the four activities at the present and for 1985 and 2000. The greatest increase in needs will be for swimming and camping. In all four cases there is a vast need to increase the supply of facilities to meet even present needs. The implication is strong that existing public and private programs providing recreation facilities will have to be greatly expanded if these needs are to be met.

Needs for other activities exist, although at the present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs chapter. It is probably safe to assume that present and projected needs for these activities show a similar pattern to the four activities.

REGIONAL PLANNING AGENCY RECOMMENDATIONS

This Region's planning services are provided by the Southeastern Regional Planning and Economic Development District (SRPEDD) which was organized in 1968. Prior to that time planning was conducted by the Southeastern Massachusetts Regional Planning Program which prepared *Natural Resources of Southeastern Massachusetts* in 1959. A new open-space and recreation report has not been prepared since the Planning District's reorganization.

The objectives and recommendations that follow were made in the 1959 report and are consistent with the priorities of this plan and thus are incorporated as part of the 1971 SCORP recommendations for the Southeastern Massachusetts Region.

1. Regional recreation objectives should involve both the conservation and development of the Region's recreation resources. The goal of conservation includes the preservation of areas threatened by urban development, pollution, and other forms of encroachment or spoilation. Conservation of important natural areas can be achieved through a variety of techniques, such as direct acquisition, utilization of land-use controls, multiple-use development programs, public assistance to private conservation groups.
2. Other objectives are to maintain and improve the existing natural recreation resources of Southeastern Massachusetts and to take positive action to make possible fuller resource utilization by reclamation and improvement of open lands which have been cut over or otherwise damaged; construction of facilities designed to make fuller use of recreation areas; and provision of adequate means of access to recreation areas.
3. Although a number of deficiencies exist in regional tourist facilities, there is more than enough unexploited potential to provide for the future needs of the Region's residents and to offer a sound basis for an expanding commercial tourist industry. The chief prerequisites for a well-developed regional recreational program are (1) additional state, federal and local investments, (2) effective tourist promotion, and (3) timely action to preserve recreation areas for future use.

Region VI: Cape Cod

THE SETTING FOR RECREATION

General Characteristics

The Cape Cod Planning Region is shaped like an arm curved to the north to embrace Cape Cod Bay. Joined to the Southeastern Massachusetts Region in the northwest, the Cape is surrounded by Buzzards Bay and Vineyard Sound in the southwest, Nantucket Sound in the south and the Atlantic Ocean along the outer eastern and northern edges. The Cape Cod Region includes all of the towns in Barnstable County. Connected to the mainland by a railroad bridge and two highway bridges, the Cape is a man-made island created by the Cape Cod Canal.

Except for three low-lying ridges the Cape is fairly level. Most of western Cape Cod is comprised of glacial moraine, outwash plains, and kettle hole ponds. The northern part of the Cape is composed of recent deposits of wind-drifted and water-washed sands which have formed large dune areas.

History and Culture

On November 11, 1620 the Pilgrims made their first North American landfall at the Cape's tip. This place, named Provincetown, was soon abandoned and the Pilgrims established a new colony in Plymouth where weather conditions were less harsh. In 1637 the Cape's first town, Sandwish was settled. Since the Cape lacks arable land, it was difficult to make a living and so the inhabitants turned to the sea. Cod and oysters became staples of the fishing fleet while whalers roamed the seven seas.

There were few early industries, although a fertilizer plant was established at Woods Hole during the 1800's. Sandwich is famous for its beautifully colored glass which was made from a secret

Figure VI-37

RELIEF MAP – CAPE COD

formula that has since been lost. Now the glass is highly prized by antique collectors

With improvements in transportation toward the end of the 19th century, Cape Cod's resort potential was realized. Today the Cape's main economic interest is the summer tourist industry. In order to balance the Region's annual economy, efforts are being made to expand the tourist season and to modernize the 300-year-old fishing industry.

Population

More than any other region in Massachusetts, Cape Cod is influenced by a seasonal influx of visitors. These visitors greatly increase the population, particularly on weekends, and add to the demand for municipal services and recreation facilities. The population information presented in this section is based on the number of permanent residents, although the demand and need figures in figure VI-43 have been adjusted according to seasonal increases in facility requirements.

With 2% of the state's population and 5% of the state's land and water area, or 400 square miles, Cape Cod is sixth in size among the seven SCORP regions. There are 15 towns in the region, nine in the *less dense* group and six in the *open* population group (see figure VI-38 and table VI-21).

Transportation

Two highway bridges connect the Cape to the mainland. The Mid-Cape Highway, U.S. Route 6, is the Region's main road, with Route 28 running along the south side of the Cape and Route 6-A along the north. The major highway on the outer Cape is U.S. Route 6. During busy summer weekends these roads and bridges are heavily congested with traffic. Hyannis, Barnstable and Provincetown have scheduled air service. Passenger ferry service connects the offshore islands to Woods Hole, Falmouth Heights and Hyannis on the Cape. A rail line having the potential for passenger service during the tourist season crosses the canal and ends in South Dennis.

Table VI-21

Population and Land and Water Acres by Density Group, 1970
Cape Cod Region

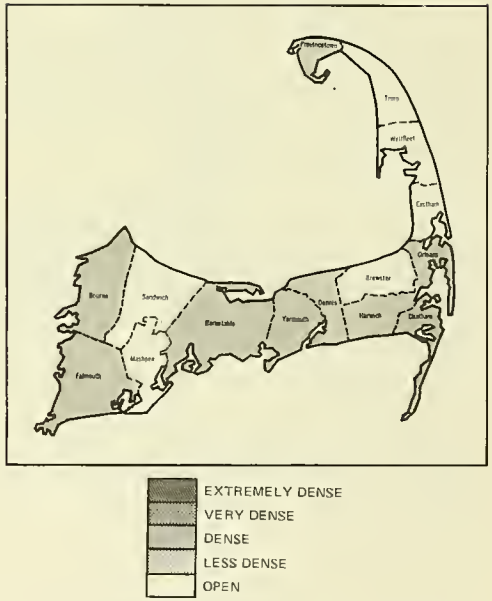
Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	—	—	—
Very Dense	—	—	—
Dense	—	—	—
Less Dense	83,319	87%	65%
Open	13,537	13%	35%
Regional Total:	96,856	100%	100%

Recreation Potential

The Cape is the state's most popular summer vacation area. Many Massachusetts residents, as well as thousands of out-of-staters from all over the country, visit or vacation on the Cape every year.

The Cape offers opportunities for practically every kind of water-based recreation activity imaginable, from clam digging to deep-sea fishing. An important feature in terms of swimming is that the Cape Cod peninsula divides the warm Gulf Stream waters of the south from the cold waters to the north. South Cape beaches have water temperatures well up into the 70's while north Cape beach waters are generally much colder. In addition to saltwater facilities there are freshwater ponds (many under-utilized) which offer excellent opportunities for swimming and fishing.

Figure VI-38



Nearly the entire outer Cape, from Chatham to Provincetown, has been set aside as the Cape Cod National Seashore. This fragile arm of land - with its marshes, sand dunes, pines and oaks - is a place of wild beauty.

SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open-Space Inventory are shown in figure VI-39. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. Cape Cod has a total of 58,249 acres of recreation land. These lands are shown by ownership class and population density in table VI-22.

In this Region the state is the smallest supplier of recreation acres and the federal government the largest with the Cape Cod National Seashore. Municipalities also provide a substantial percentage of the Region's open-space and recreation lands.

Water Resources

Cape Cod has an estimated 155 impoundments and great ponds (natural water bodies over ten acres) which have a total water surface of 8899 acres or 3.5% of the Region's area. Compared to other regions in the state, this is a relatively high percentage. Many of these ponds have not been developed for public use because of the popularity of ocean beaches.

Although the Cape does not have any major rivers the coastal waters and Canal were examined and classified by the Massachusetts Water Resources Commission's Division of Water Pollution Control (see figure VI-40).

Facilities

Recreation facilities for the four major activities - swimming, picnicking, camping and boating - were inventoried to determine the regional supply. The eight graphs in figure VI-41 summarize the percent of annual activity days by density group for the Region and the percent of distribution of recreational facilities by ownership category for each population density group. Also listed are the total annual activity days for each activity.

The following trends are revealed in the graphs:

The private sector provides most of the camping and boating facilities; the state contributes a substantial amount of the camping facilities; and municipalities supply a substantial proportion of the boating facilities, particularly in the *open* density areas.

Swimming and picnicking facilities are relatively well distributed between private, municipal and federal suppliers, with a very minor input from the state.

When all facilities are considered together their ownership distribution, like that of the open-space and recreation acres, is fairly even. In this Region the state owns the least land and supplies the fewest facilities.

Potential Resources

The 1970 Outdoor Recreation and Open Space Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher education institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools, colleges and seminaries. Statewide these lands total 206,619 acres with less than 1% of them in the Cape Cod Region.

Table VI-22
Existing Recreation Acres by Density Group
and Ownership Category, 1970
Cape Cod Region

Density Group	Total		Ownership Category							
			Private		Municipal		State		Federal	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	—	—	—	—	—	—	—	—	—	—
Very Dense	—	—	—	—	—	—	—	—	—	—
Dense	—	—	—	—	—	—	—	—	—	—
Less Dense	37,739	35.5%	4,657	12%	19,413	6%	2,293	52%	11,376	30%
Open	20,510	64.5%	3,569	17%	803	65%	2,698	13%	13,440	5%
Regional Total:	58,249	100%	8,226	14%	20,216	34%	4,991	9%	24,816	43%

CAPE COD REGION

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Roland C. Nickerson	Brewster	1,779

State Forests

2.	Barnstable	Barnstable	59
3.	Brewster	Brewster	18
4.	Falmouth	Falmouth	18
5.	Sandwich	Sandwich	21
6.	Shawme-Crowell	Bourne	565

State Reservations

7.	Scussett Beach	Bourne	365

Division of Fisheries and Game

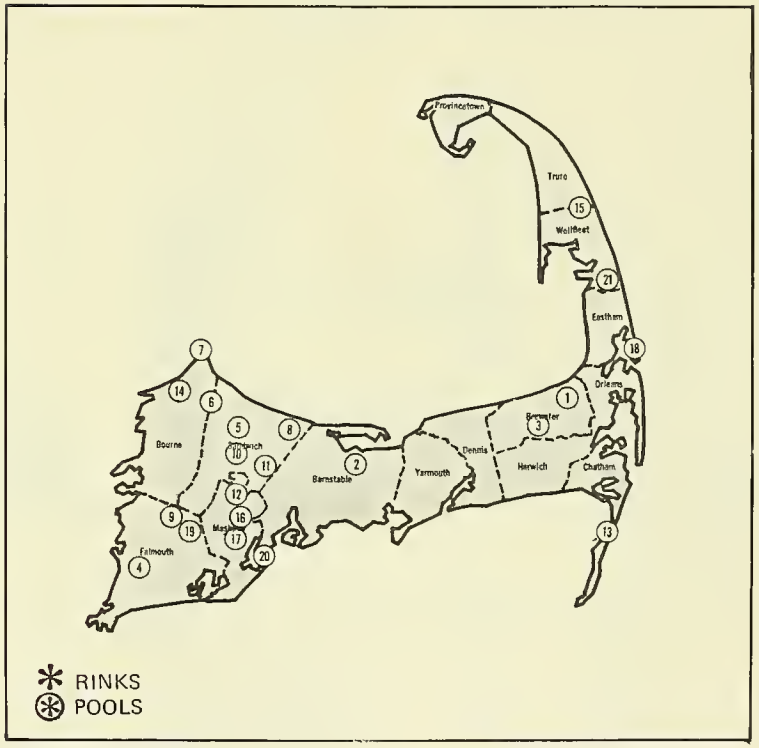
8.	Sandwich	Sandwich	133
9.	Crane	Falmouth	1,615
10.	Fisk-Forestdale Lot	Sandwich	117
11.	Hog Pond Lot	Sandwich	20
12.	Mashpee Pond Lot	Mashpee	25

U. S. Department of the Interior
National Park Service

13.	Monomy National Wildlife Refuge	Chatham	2,698
14.	Bourne Scenic Park	Bourne	77
15.	Cape Cod National Seashore	Chatham Eastham Orleans Truro Wellfleet Provincetown	21,545

Figure VI-39

SELECTED RECREATION LANDS AND SITES
CAPE COD 1970



Trustees of Reservations

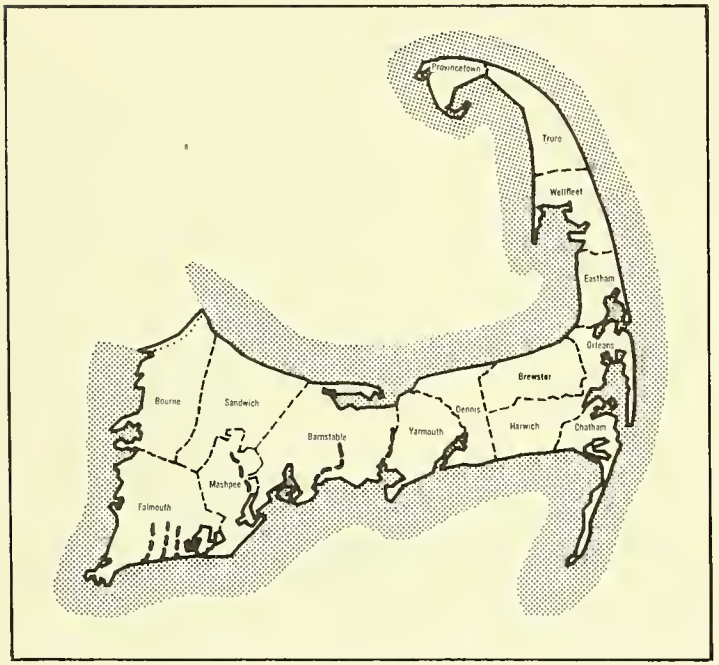
16.	Lowell-Holly	Mashpee	130
17.	Mashpee River	Mashpee	375

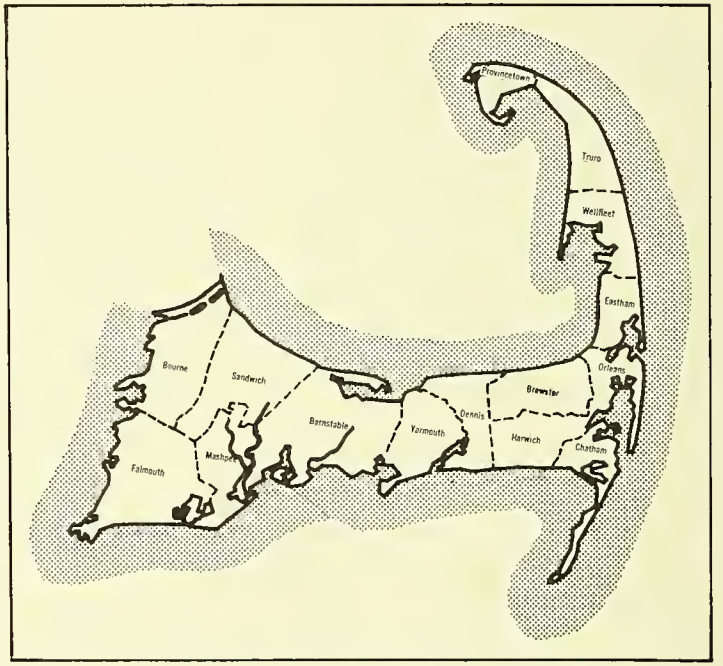
Massachusetts Audubon Society

18.	Outermost House	Eastham	50
19.	Ashumet Holly	Falmouth	42
20.	Poponesset Sandspit	Barnstable Mashpee	25
21.	Wellfleet	Wellfleet	700

Figure VI-40

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS CAPE COD 1971





Legend-Proposed

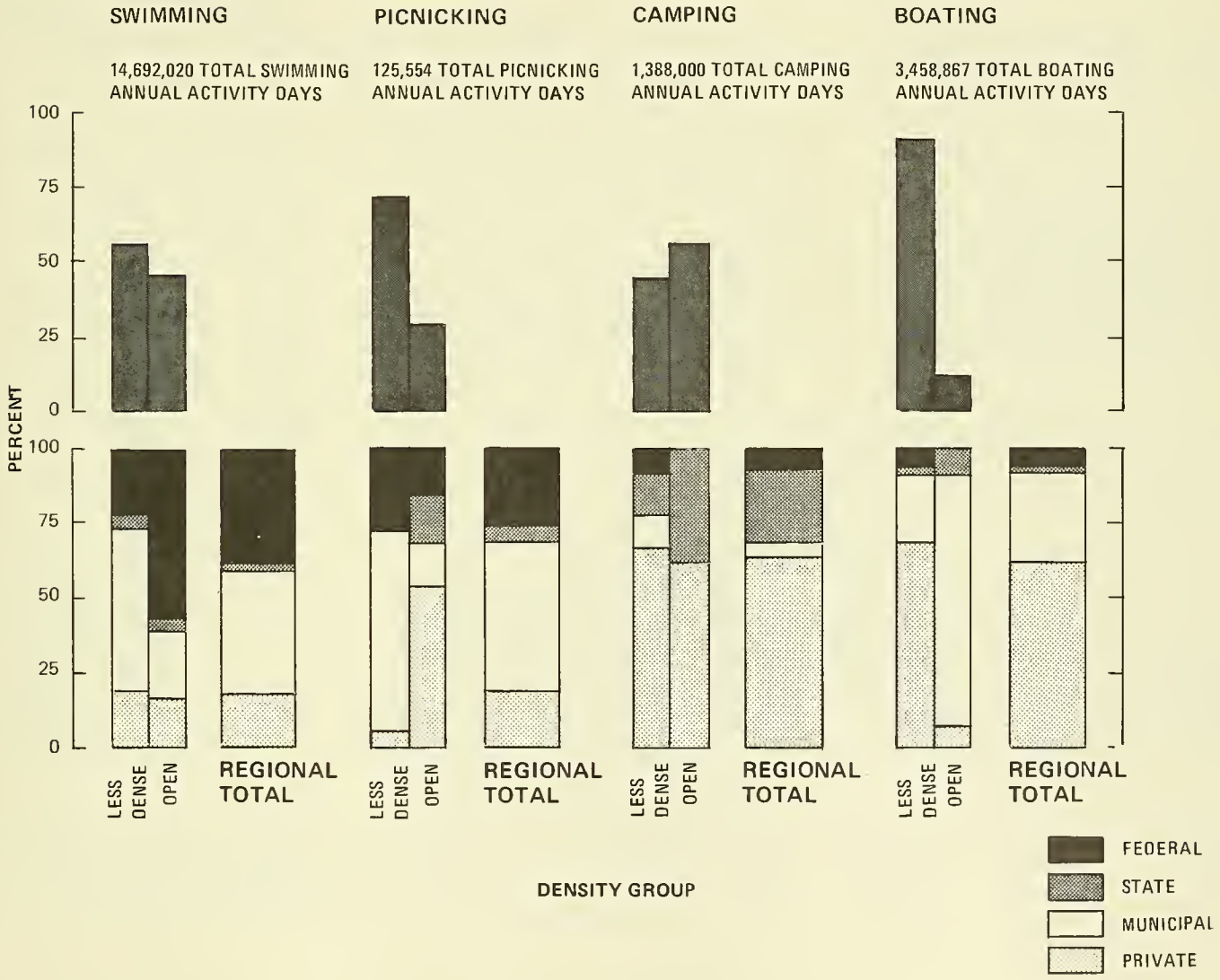
Fresh Water	Salt Water
..... A. Quality	A. Quality
——— B. Quality	B. Quality
— — — C. Quality	C. Quality
——— D. Quality	

Legend-Existing

Fresh Water	Salt Water
——— Meets Stds.	Meets Stds.
— — — Approaching Stds.	Approaching Stds.
——— Below Stds.	Below Stds.

*SEE APPENDIX F

PERCENT OF ANNUAL ACTIVITY DAYS BY DENSITY GROUP – CAPE COD 1970



While many of these lands will not be available in the near future, they do represent a small reserve of open lands which may have a recreational potential.

DEMAND - NEEDS

Lands

The relationship between the location of recreation lands and population density in the Cape Cod Region is shown in figure VI-42.

Based on 1970 population figures there appear to be sufficient recreation lands in both of the Cape's population density groupings. Open-space standards have not yet been adopted in Massachusetts, although nationally it is generally accepted that the minimum is 10-15 acres per 1000 population in urban areas (the *very dense* and *extremely dense* population groups). None of the Cape's communities has high population densities. In the towns of *less dense* population there are 455 acres/1000 population and in the *open* population group there are 1578 acres/1000 population.

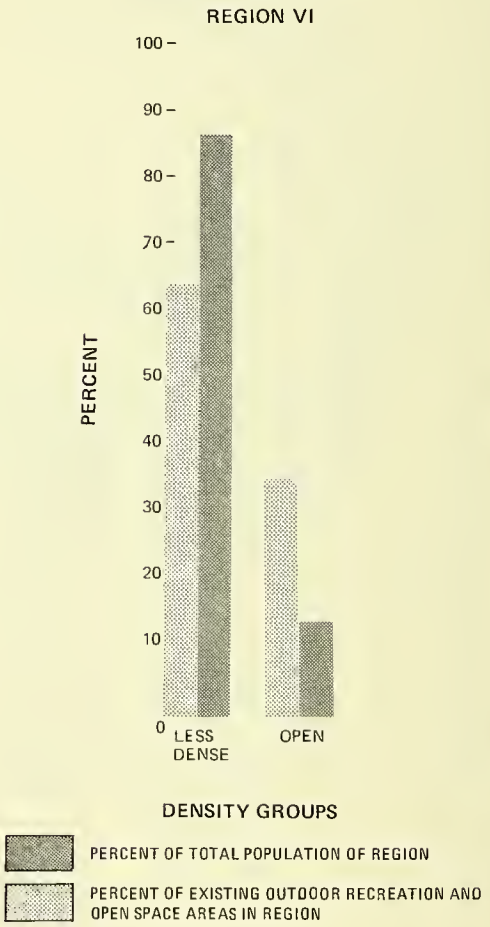
In spite of the apparent adequacy of supply, there are several situations that would justify new land acquisition.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by regional figures. Facilities and lands to serve local residents may well be needed, particularly neighborhood parks and day-use facilities.

Table VI-23
Potential Recreation Acres by Density Group
and Ownership Category, 1970.
Cape Cod Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	—	—	—	—	—	—
Very Dense	—	—	—	—	—	—
Dense	—	—	—	—	—	—
Less Dense	800	96%	—	800	—	—
Open	26	4%	1	25	—	—
Regional Total:	826	100%	1	825		

Figure VI-42



b. New acquisitions may be required to keep pace with population increases and new residential developments.
c. Many diverse types of recreation land were included in the inventory of recreation areas. Although a region may have enough acreage, it may still be lacking in lands suitable for certain facilities and activities. In the Cape Cod Region there is a shortage of camping and picnicking opportunities; thus new acquisitions may be needed to meet specific shortages if suitable public lands are not available and private facilities do not fill the gap.
d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved, along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.
e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.
f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue

Facilities

The supply of swimming, picnicking, camping and boating facilities and the recreational demand for them is indicated in table VI-24.

The demand for activities and the supply of facilities seem to be well distributed except for swimming, and the percentage imbalances for these activities are not particularly high. A percentage imbalance between the supply and demand does not necessarily imply specific shortages or surpluses; on the contrary, these figures act as indicators suggesting locations for future facilities. A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the State-Wide Needs chapter.

The relationship between supply, demand and needs for the four activities at the present and for 1985 and 2000 is presented in figure VI-43. Swimming and boating show a surplus that is projected through the end of the century, while camping shows an accelerating need. These figures are deceptive because on the Cape many municipal facilities (which provide a substantial percentage of the supply) often restrict the general public even though providing for local residents. This is particularly true of beaches which are plentiful but may lack parking lots and support facilities. Camping has the most serious shortage of facilities. Because of the Cape's vacation-resort nature it attracts countless visitors each year and the amount of demand for camping facilities may be seriously underestimated. The Cape Cod National Seashore draws thousands of visitors who are interested in a natural seaside experience, yet the National Seashore provides no camping. Overcrowding of private facilities emphasizes this need.

It is clear that existing public and private programs providing recreation facilities should be expanded, particularly for camping and picnicking.

Needs for other activities exist, although at present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs chapter. It is probably safe to assume that present and projected needs for these activities show a similar pattern to the four activities.

REGIONAL PLANNING AGENCY RECOMMENDATIONS

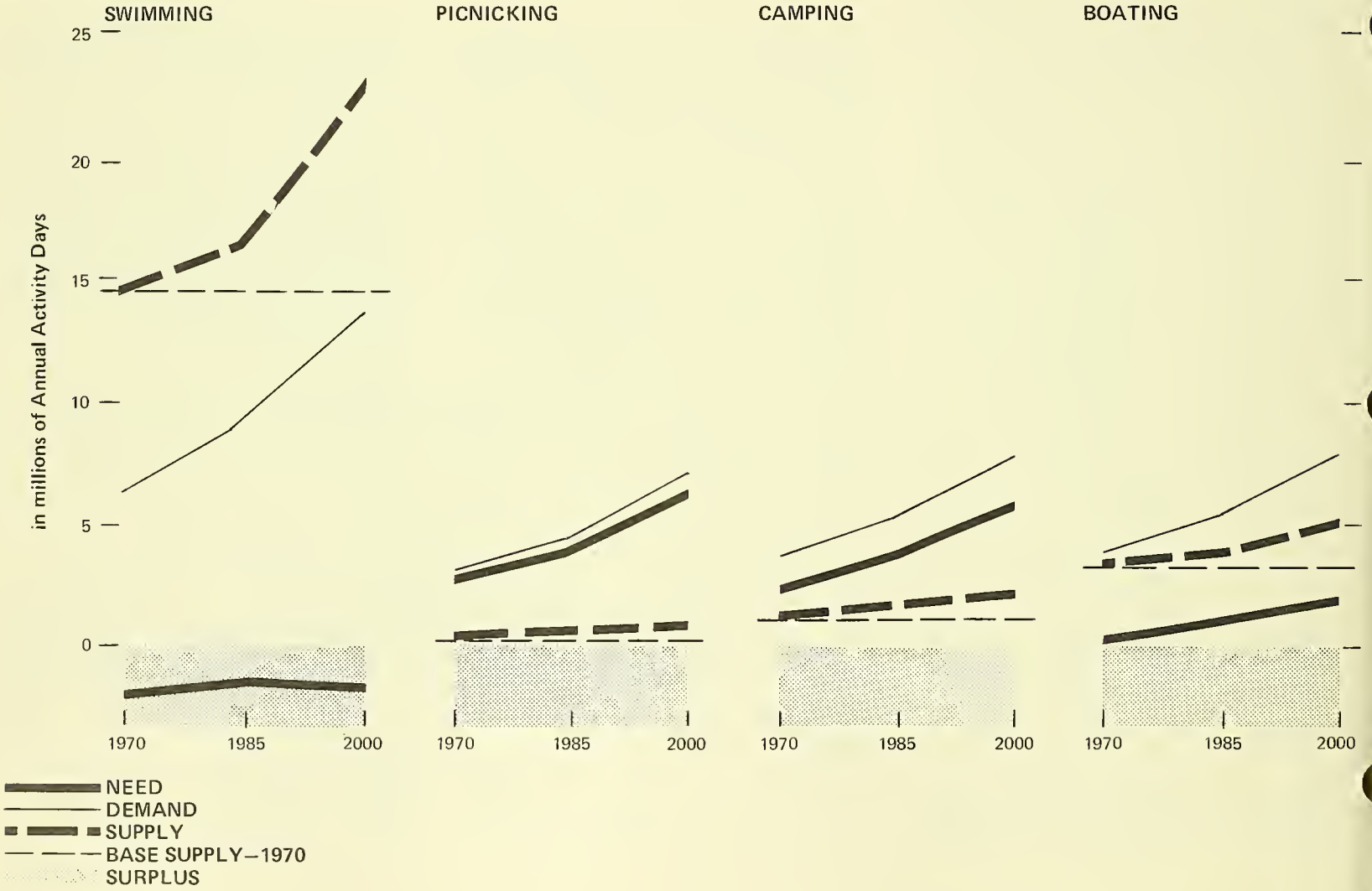
The Cape Cod Planning and Economic Development Commission provides planning services for Barnstable County. In June 1970 *Working Paper: Open Space/Recreation* was published as part of the Region's overall comprehensive planning pro-

Table VI-24
Supply and Demand by Density Group for
Four Activities, 1970
Cape Cod Region

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	—	—	—	—	—
Very Dense	—	—	—	—	—
Dense	—	—	—	—	—
Less Dense	55%	71%	44%	89%	86%
Open	45%	29%	56%	11%	14%
Regional Total:	100%	100%	100%	100%	100%

Figure VI-43

NEEDS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – CAPE COD



gram. A final open-space and recreation report has not been made for the Cape hut a philosophy has been developed in the working paper. This philosophy is consistent with thc 1971 SCORP recommendations which are incorporated as part of the plan for the Cape Cod Region.

1. The availability of recreation and open-space areas, both active and passive, is of prime importance not only to people living in "megalopolis" but also to those living in the country.
2. The existing open-space and potential recreational resources of the Cape not only add to the residents' aesthetic active enjoyment of the area but also provide justifiably sound tourist attractions.
3. The Cape's natural resources have a saturation point in terms of use.
4. Overuse may destroy the desireability of the resource.
5. The Region must provide for the tremendous number of people seeking water-oriented recreation activities.
6. Wetland areas must be protected in their natural state in order to preserve the rural seaside atmosphere of Cape Cod, preserve its wildlife, and protect its marine ecology.

Region VII: The Islands of Nantucket Sound

THE SETTING FOR RECREATION

General Characteristics

The Islands of Nantucket Sound Planning Region includes the islands of Nantucket, Martha's Vineyard, and the Elizabeth Islands, located southeast of Cape Cod. Nantucket Island lies 16 miles south of Cape Cod, is about 15 miles from east to west, and about ten miles from north to south. It has nearly 50 square miles of land area. Martha's Vineyard, about three and one-half miles south of Falmouth and about 15 miles northwest of Nantucket, is about 20 miles long, ten miles wide and encompasses over 90 square miles. The Elizabeth Islands, also known as the Gosnolds, are over 12 square miles in size and are made up of four large islands and several smaller ones.

All of the Region's landforms are the result of glaciation. The Gosnolds, and parts of the Vineyard and Nantucket, are formed of moraine materials. On Martha's Vineyard ridges of the western moraine average between 200' - 300' in elevation, while the moraines on the Gosnolds and on Nantucket average only 100' in elevation. Below the moraine areas on Martha's Vineyard and Nantucket are extensive outwash plains where many ponds are located. At the western end of Martha's Vineyard are the Gay Head cliffs which have been designated as a National Natural Landmark. These cliffs are made of brightly colored layered clays which streak across the cliffs' face.

History and Culture

Bartholomew Gosnold, who discovered and named Cape Cod, Martha's Vineyard and the Elizabeth Islands, built a fort on the Elizabeth Islands in 1602 to trade furs with the Indians. Nantucket was settled in 1641 and Martha's Vineyard in 1642. Until 1795 Nantucket was known as the town of Sherborn and was part of the New York Province. Farming, fishing and sheep raising provided early settlers a livelihood on both Nantucket and Martha's Vineyard. As the lands were exhausted, people turned more and more to the sea for their living. By 1768 Nantucket had more than 125 whaling ships and was America's largest exporter of whale oil; the world's largest sperm-oil candle factory was located on Martha's Vineyard.

Today Nantucket and Martha's Vineyard rely on their historic charm and natural beauty to attract the summer tourist trade. The Elizabeth Islands are largely privately owned, with small settlements at Gosnold and Cuttyhunk.

Population

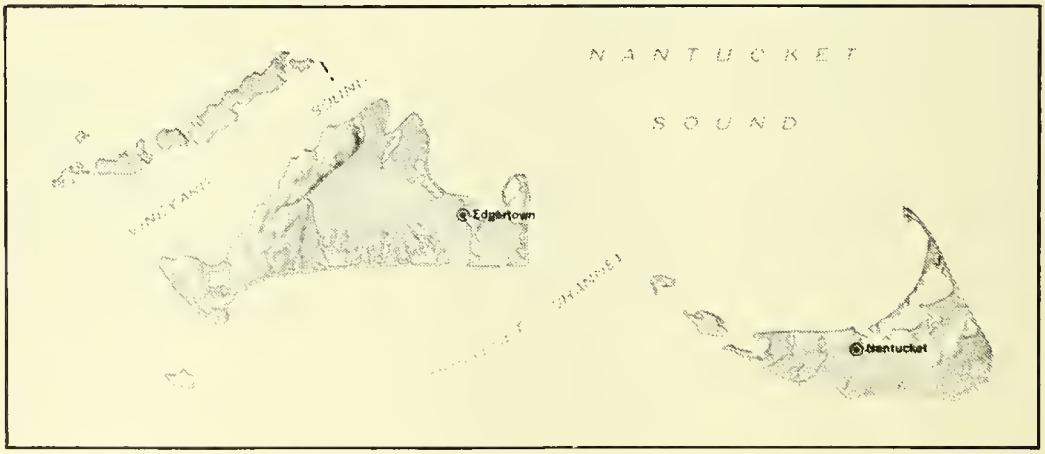
Like Cape Cod the Islands of Nantucket Sound are strongly influenced by the seasonal influx of summer tourists. On Martha's Vineyard it is estimated that the year-round population of approximately 6000 swells to over 40,000 on the season's peak days. The experience on Nantucket is similar and there can be no doubt of the impact of this crush on the communities and the environment.

The population information presented in this section is based on the number of year-round residents, although the demand and need figures have been adjusted for seasonal increases.

With 9891 people, (.17% of the state's population) and 2% of the land (160 square miles) the Islands of Nantucket Sound Region is the small-

Figure VI-44

RELIEF MAP – ISLANDS OF NANTUCKET SOUND



est of the seven SCORP planning regions. The Region is made up of Duke's County with six towns, (two in the *less dense* population category and four in the *open* category) and Nantucket County with one town, which is in the *open* population category (see figure VI-45 and table VI-25).

The region is somewhat unusual compared to other SCORP regions in that most of its population is found in the lowest population density category.

Transportation

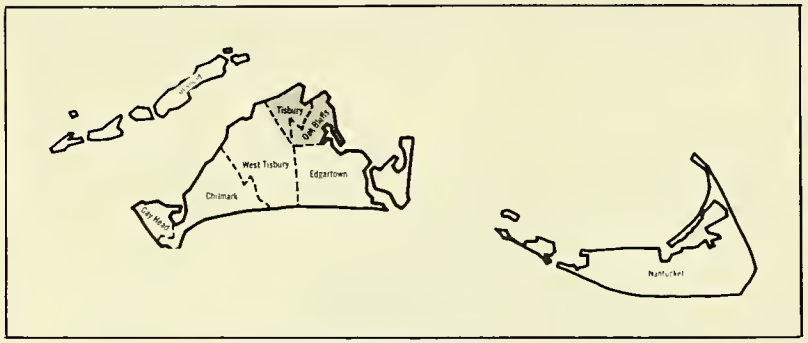
Both Martha's Vineyard and Nantucket have frequent service to the mainland by boat where bus connections to Boston and Providence are available. Boat service from New Bedford to Cuttyhunk is available. Nantucket and the Vineyard have surfaced roads, although none are numbered state or federal highways; they also have franchised bus service. The main islands have scheduled air service and the Region has four airfields.

Table VI-25
Population and Land and Water Acres by Density Group, 1970
Islands of Nantucket Sound Region

Density Group	Population		Percent Land and Water
	Total	Percent	
Extremely Dense	—	—	—
Very Dense	—	—	—
Dense	—	—	—
Less Dense	3,642	37%	12%
Open	6,249	63%	88%
Regional Total:	9,891	100%	100%

Figure VI-45

POPULATION DENSITY
ISLANDS OF NANTUCKET SOUND 1970



Recreational Potential

Nantucket Island is endowed with unparalleled beauty. The town's crooked cobblestone streets lined with sea captains' stately homes give way to rolling meadows and tiny villages throughout the rest of the island. An old grist windmill, whaling museum and picturesque wharves offer a unique glimpse into America's past.

Martha's Vineyard is an island community which includes several towns. Prominent among these summer resort towns are Edgartown, Oak Bluffs and Gay Head.

The Elizabeth Islands, except for Cuttyhunk, are privately owned and completely uncommercialized. Narrow unpaved lanes and footpaths enable these islands to retain their primitive beauty. Naushon Island has been virtually untouched and survives as one of New England's true wilderness areas.

The Islands Region offers the best in sea and seashore recreation with few of the problems that plague similar areas on the mainland.

SUPPLY

Land Resources

Lands identified in the 1970 Outdoor Recreation and Open-Space Inventory are shown in figure VI-46. These sites are generally limited to larger areas owned by federal and state agencies and quasi-public organizations. The Islands of Nantucket Sound have a total of 6268 acres of recreation and open-space land. In the table that follows (VI-26) these lands are shown by ownership class and population density.

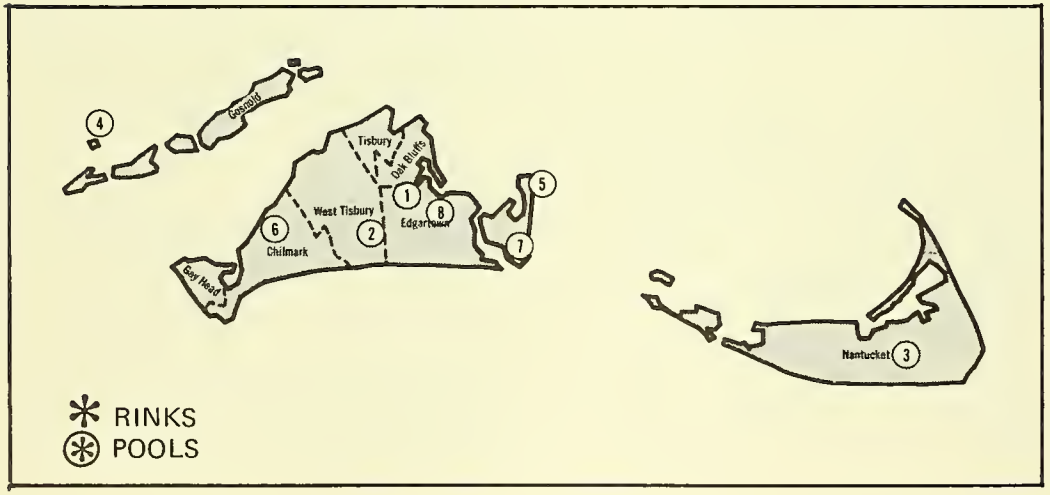
In this Region the state and private sectors supply most of the recreation acreage.

Table VI-26
Existing Recreation Acres by Density Group
and Ownership Category, 1970.
Islands of Nantucket Sound

Density Group	Total		Ownership Category							
			Private		Municipal		State		Federal	
	acres	percent	acres	percent	acres	percent	acres	percent	acres	percent
Extremely Dense	—	—	—	—	—	—	—	—	—	—
Very Dense	—	—	—	—	—	—	—	—	—	—
Dense	—	—	—	—	—	—	—	—	—	—
Less Dense	2,191	35%	385	18%	59	2%	1,747	80%	—	—
Open	4,077	65%	1,593	39%	769	20%	1,715	42%	—	—
Regional Total	6,268	100%	1,978	31%	828	14%	3,462	100%	—	—

Figure VI-46

SELECTED RECREATION LANDS AND SITES ISLANDS OF NANTUCKET SOUND 1970



THE ISLANDS OF NANTUCKET SOUND REGION

Department of Natural Resources
Division of Forests and Parks

State Parks

	Name	Municipality	Acreage
1.	Martha's Vineyard Beach	Edgartown Oak Bluffs	56

State Forests

2.	Martha's Vineyard	Edgartown West Tisbury	3,120
3.	Nantucket	Nantucket	137

Division of Fisheries and Game

4.	Penikese Island	Gosnold	60

Trustees of Reservations

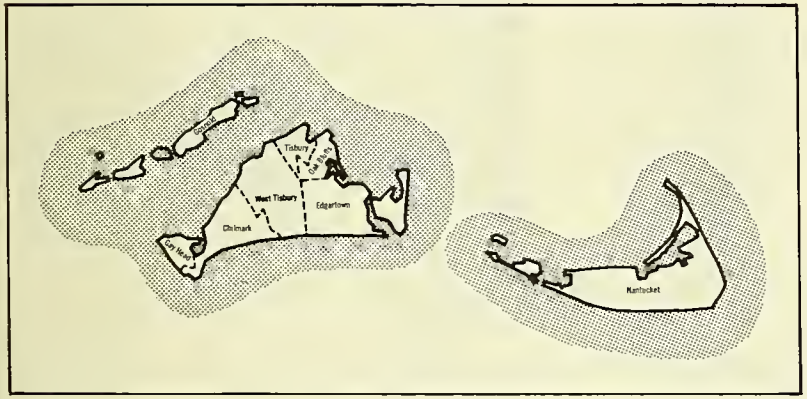
5.	Cape Poge	Edgartown	371
6.	Menemsha Hills Reservation	Chilmark	48
7.	Wasque Reservation	Edgartown	200

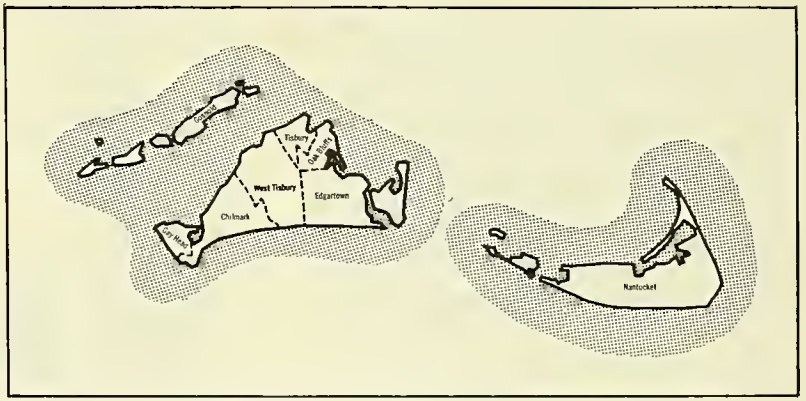
Massachusetts Audubon Society

8.	Felix Neck	Edgartown	250

Figure VI-47

WATER QUALITY: PROPOSED STANDARDS AND EXISTING CONDITIONS ISLANDS OF NANTUCKET SOUND 1971





Legend-Proposed

Fresh Water	Salt Water
A. Quality	A. Quality
B. Quality	B. Quality
C. Quality	C. Quality
D. Quality	

Legend-Existing

Fresh Water	Salt Water
Meets Stds.	Meets Stds.
Approaching Stds.	Approaching Stds.
Below Stds.	Below Stds.

*SEE APPENDIX F

Water Resources

On the Islands of Nantucket Sound there are 39 impoundments and great ponds (natural water bodies over ten acres) with a total surface area of 5450 acres, which equals 5.3% of the Region's area. These freshwater ponds, plus the Gulf Stream waters of the Atlantic Ocean, make this Region the best endowed with water resources of all the SCORP regions.

Because the Islands have no major streams, only the coastal waters were examined and classified by the Massachusetts Water Resources Commission's Division of Water Pollution Control (figure VI-47). Except for a few small local problems of a seasonal nature, the tested waters met proposed standards.

Both groundwater and surface water provide the Region's domestic and municipal water supplies. Outwash plains tend to act as large groundwater recharge areas, providing a predictable water supply. Moraine areas, however, are less permeable with the result that surface ponds and streams form and produce undependable water supplies.

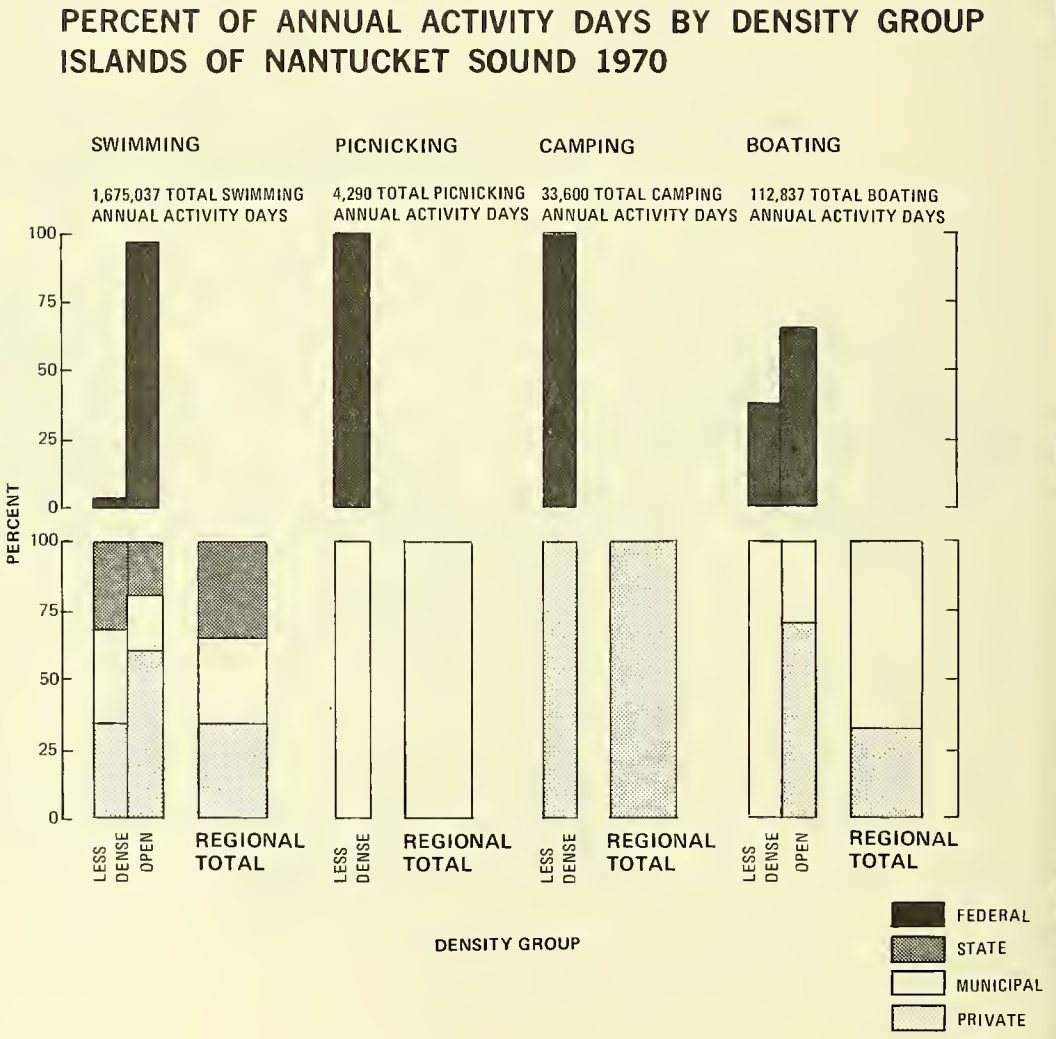
Facilities

Recreation facilities for the four major activities - swimming, picnicking, camping and boating - were inventoried to determine the regional supply. The eight graphs in figure VI-48 summarize the percentage of annual activity days by density group for the Region and the percent distribution of recreational facilities by ownership category for each population density group. Also listed are the total annual activity days for each activity.

The graphs revealed certain trends:

While the state is the largest supplier of land, it supplies only a moderate percentage of swimming facilities.

Figure VI-48



Although municipalities own the least amount of land, they supply all of the picnicking and most of the boating facilities.
The private sector provides all of the camping.

The relatively large percentage of land owned by the state, in spite of the small contribution of recreation facilities inventoried, must be viewed in light of the state's diverse roles. Much of the land owned is used for conservation purposes or the protection of unique resources. In a region such as this, where the local economy is dependent on tourism, the state probably should not be providing facilities in competition with commercial efforts. However, the state can work with the private sector and provide supplementary facilities when a gap exists.

Potential Resources

The 1970 Outdoor Recreation and Open Space Inventory identified potential recreation sites which are essentially open-space lands. These potential recreation resources included state mental health, public health, correctional and higher educational institution lands; federal military installations; municipal water lands and town dumps; and private and religious secondary schools. colleges and seminaries. Statewide these lands total 206,619 acres with 0.5% in this Region.

While many of these lands will not be available in the near future, they do represent a small reserve of open lands which may have a recreational potential.

Table VI-27
Potential Recreation Acres by Density Group
and Ownership Category, 1970.
Islands of Nantucket Sound Region

Density Group	Total		Ownership Category			
			Private	Municipal	State	Federal
	Acres	Percent	acres	acres	acres	acres
Extremely Dense	—	—	—	—	—	—
Very Dense	—	—	—	—	—	—
Dense	—	—	—	—	—	—
Less Dense	850	85%	—	4	192	654
Open	155	15%	—	—	—	155
Regional Total:	1,005	100%	—	4	192	809

DEMAND - NEEDS

Lands

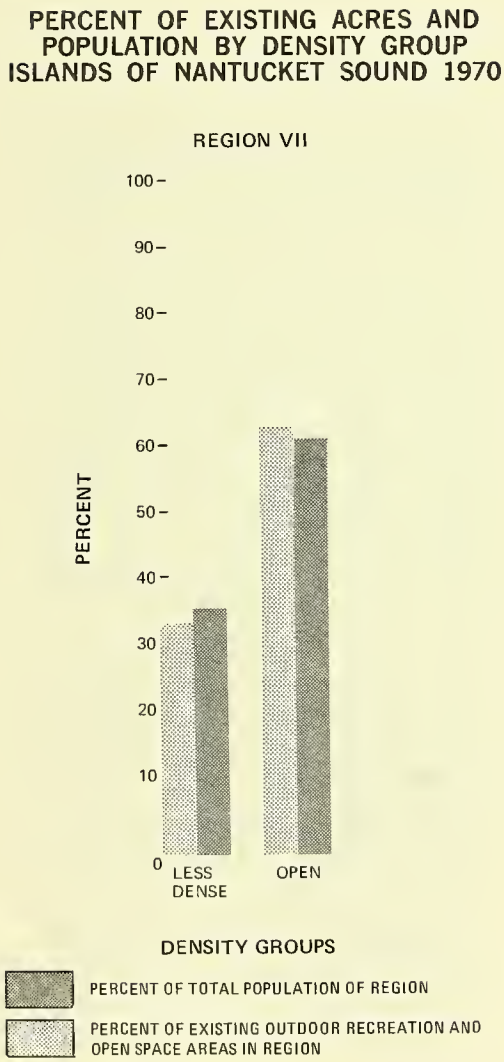
This Region is unusual in that: a) recreation lands are located in the same density groups as is the population and in approximately the same percentage, and b) most of the lands and people are located in the *open* population group (figure VI-49).

Based on the 1970 population figures there appear to be sufficient recreation lands in both of the density groups. As yet open-space standards have not been adopted for Massachusetts, although nationally it is generally accepted that the minimum is 10-15 acres per 1000 population in urban areas (the *very dense* and *extremely dense* population groups). None of the communities in this Region has a high population density. In towns of *less dense* population there are 548 acres/1000 and in the *open* population group there are 679 acres/1000 population.

In spite of the apparent adequacy of supply there are several situations that would justify new land acquisitions.

a. In localized areas deficiencies are not apparent in the aggregate picture presented by regional figures. Facilities and lands to serve local residents may well be needed, particularly neighborhood parks and day-use facilities.
b. New acquisitions may be required to keep pace with population increases and new residential developments.
c. Many diverse types of recreation lands were included in the inventory of recreation areas. Although a region may have enough acreage, it may still be lacking in lands suitable for certain facilities and activities. In the Islands of Nantucket Sound Planning Region there is a shortage of camping and picnicking opportunities; thus new acquisitions may be needed to meet specific shortages if suitable public

Figure VI-49



lands are not available and private facilities don't fill the gap.

d. Outstanding natural resources of local, regional, state or national significance should be acquired and preserved along with lands that would enhance or protect their setting or provide support facilities. Examples are unique geologic, botanical or scenic features, cultural or historic resources and major recreational resources.
e. Land acquisitions must be made in order to provide public access to water areas and help alleviate the shortage in boating and swimming already noted.
f. Wetlands protection has the dual effect of providing flood control and wildlife habitat; the wetland protection program should continue.

Facilities

The supply of swimming, picnicking, camping and boating facilities, and the recreational demand for them is shown in table VI-28.

The demand is well distributed between the population groups but the facilities are not. Nearly all swimming and boating facilities are in the *open* group while all camping and picnicking facilities are located in the two towns of the *less dense* category.

A percentage imbalance between the supply and demand does not necessarily imply specific shortages or surpluses; rather, the purpose of these figures is to act as indicators for the location of new facilities. This Region, in particular, would seem to need a more regular distribution of facilities relative to population and demand. A general evaluation by activity of where facilities should be located in relationship to population and who should provide them is included in the Statewide Needs chapter.

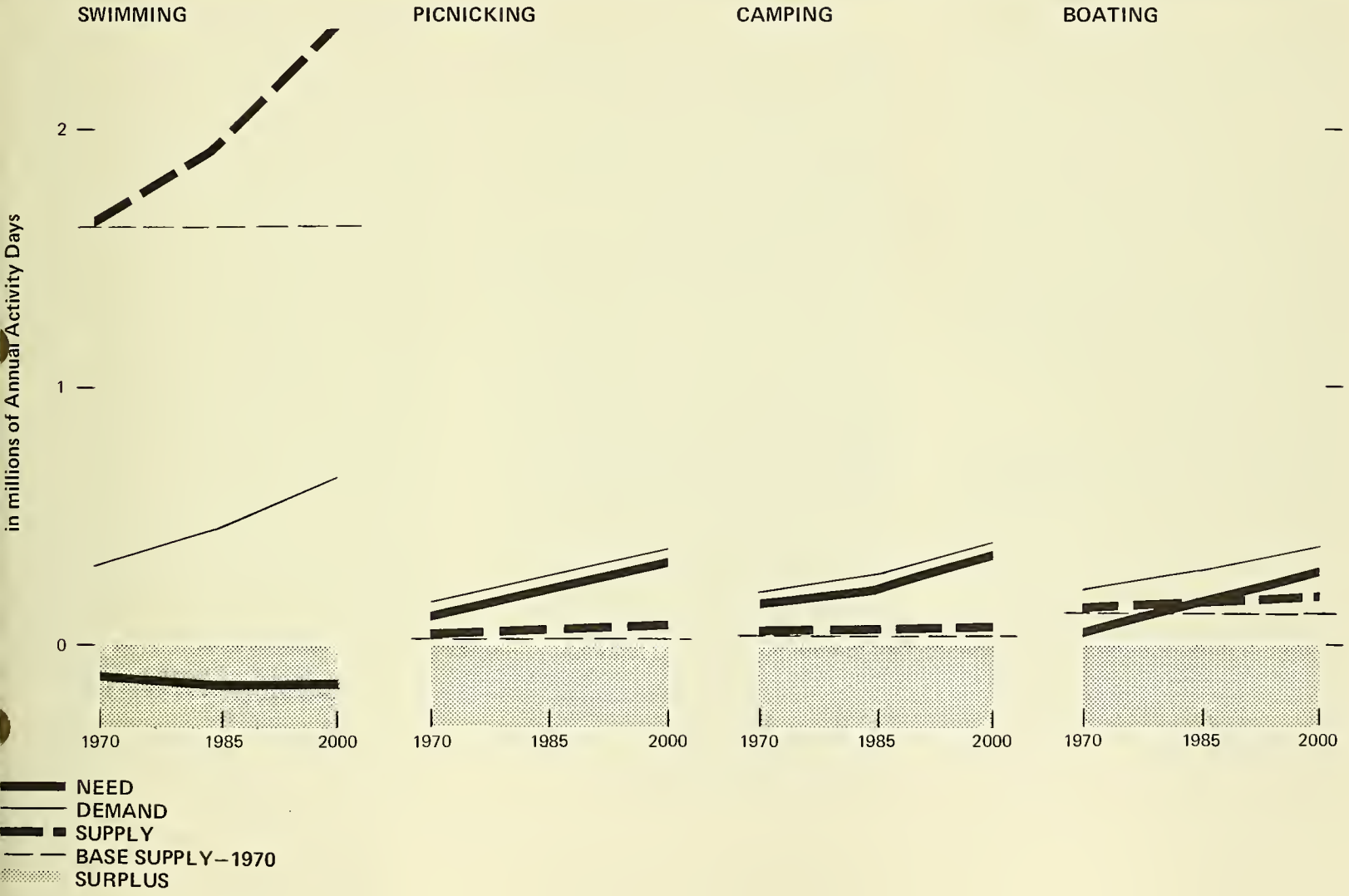
The relationship between supply, demand and needs for the four activities at the present and for 1985 and 2000 is presented in figure VI-50. Swimming shows a surplus that will continue through the turn of the century, while boating

Table VI-28
Supply and Demand by Density Group for
Four Activities, 1970
Islands of Nantucket Sound Region

Density Group	Percent of Regional Supply				Percent of Regional Demand
	Swimming	Picnicking	Camping	Boating	
Extremely Dense	—	—	—	—	—
Very Dense	—	—	—	—	—
Dense	—	—	—	—	—
Less Dense	4%	100%	100%	6%	46%
Open	96%	—	—	94%	54%
Regional Total:	100%	100%	100%	100%	100%

Figure VI-50

DS IN ANNUAL ACTIVITY DAYS FOR FOUR ACTIVITIES 1970, 1985, 2000 – ISLANDS OF NANTUCKET SOUND



will experience a surplus until nearly 1985. Camping shows a sharp increase in need after 1985 and the need for picnicking will increase steadily.

Of the four activities presented, the need for camping is probably most underestimated. It is as true for this Region as it is for Cape Cod that the demand for camping will expand to exceed any facilities that can be supplied between now and 2000.

Existing public and private programs providing recreation facilities should be expanded, particularly for camping and picnicking, and, in the future, for boating.

Needs for other recreation activities exist although at the present it is not possible to spell out these needs on a regional basis. A general discussion of needs for other activities is presented in the Statewide Needs chapter. It is probably safe to assume that present and projected needs for these activities show a similar pattern to the four activities.

REGIONAL PLANNING AGENCY RECOMMENDATIONS

This Region is made up of two separate counties, Dukes and Nantucket. Dukes County has a Planning and Economic Development Commission which provides planning services; Nantucket is an "unassigned" community that is not part of any planning region.

Nantucket, the town and county, are one and the same. The planning function is carried out by the town which prepared in 1970 a two-volume *Master Plan for Nantucket Island.* The master plan includes recommendations for conservation of open-space and recreation lands. These recommendations are consistent with those for the 1971 SCORP and thus are incorporated as part of the SCORP plan for the Region along with recommendations prepared by Dukes County.

It is specifically recommended that the Planning Board seek Town approval to conduct the following studies:

1) open-space acquisition and development studies.
2) historic preservation surveys and evaluations.

In evaluating projects these criteria are used to determine the degree to which the development proposed benefits the public by:

1) protecting it against safety hazards,
2) protecting it against health hazards,
3) providing a broad range of recreational opportunities,
4) preserving natural beauty,
5) preserving cultural values,
6) providing protection of life-support systems,
7) providing a satisfying living environment,
8) protecting against loss of economic opportunity,
9) insuring that the above protections and opportunities will be available to future generations.

Dukes County has prepared a preliminary study report, *Physical Features, Natural Resources and Open Space,* which was published in 1970. This is primarily an inventory of the County's resources, although some general objectives are stated. These goals and recommendations, though not specific, are consistent with this report and thus are incorporated, along with the recommendations for Nantucket, as part of the 1971 SCORP.

The Region is endowed with important physical features and natural resources that afford a significant opportunity for conservation and outdoor recreation. Any comprehensive planning program for Dukes County should place considerable emphasis on its physical features and natural resources. The area's physiography and ecology should be sufficiently understood so that the natural environment and man's development plans mutually benefit, or at least cause no harm to one another.

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STATEWIDE NEEDS

This chapter will discuss the preceding regional analyses and develop a statewide perspective on activities and special problems for which information is not currently available on a regional basis.

Supply

The 1970 Outdoor Recreation and Open Space Inventory measured the existing supply of outdoor recreation opportunities in the Commonwealth. In total, approximately 9000 sites were included in the survey.

LAND RESOURCES

Nearly 743,000 acres of outdoor recreation and open space lands were identified. The distribution of these lands by region and ownership category is shown in table VII-1. The state is the largest single landholder, and owns slightly more than half of the total existing recreation acres. In all regions except Cape Cod and Eastern Massachusetts, the state is the major owner of outdoor recreation and open space land. In the Eastern Massachusetts Region recreation lands are divided fairly equally among the four ownership categories; on Cape Cod the federal government owns 43% of the recreation lands. Most of the federally-owned land on Cape Cod is the Cape Cod National Seashore.

FACILITIES

Figure VII-1 shows the distribution of facilities for swimming, picnicking, camping and boating in total annual activity days by region. In 1970 swimming facilities provided more annual activity days than any of the other three facilities. The Eastern Massachusetts and the Cape Cod Regions together account for two-thirds of the total supply of swimming facilities in the state. The Eastern Massachu-

Figure VII-1

PERCENT DISTRIBUTION OF SUPPLY IN ANNUAL ACTIVITY DAYS FOR EACH ACTIVITY BY REGION

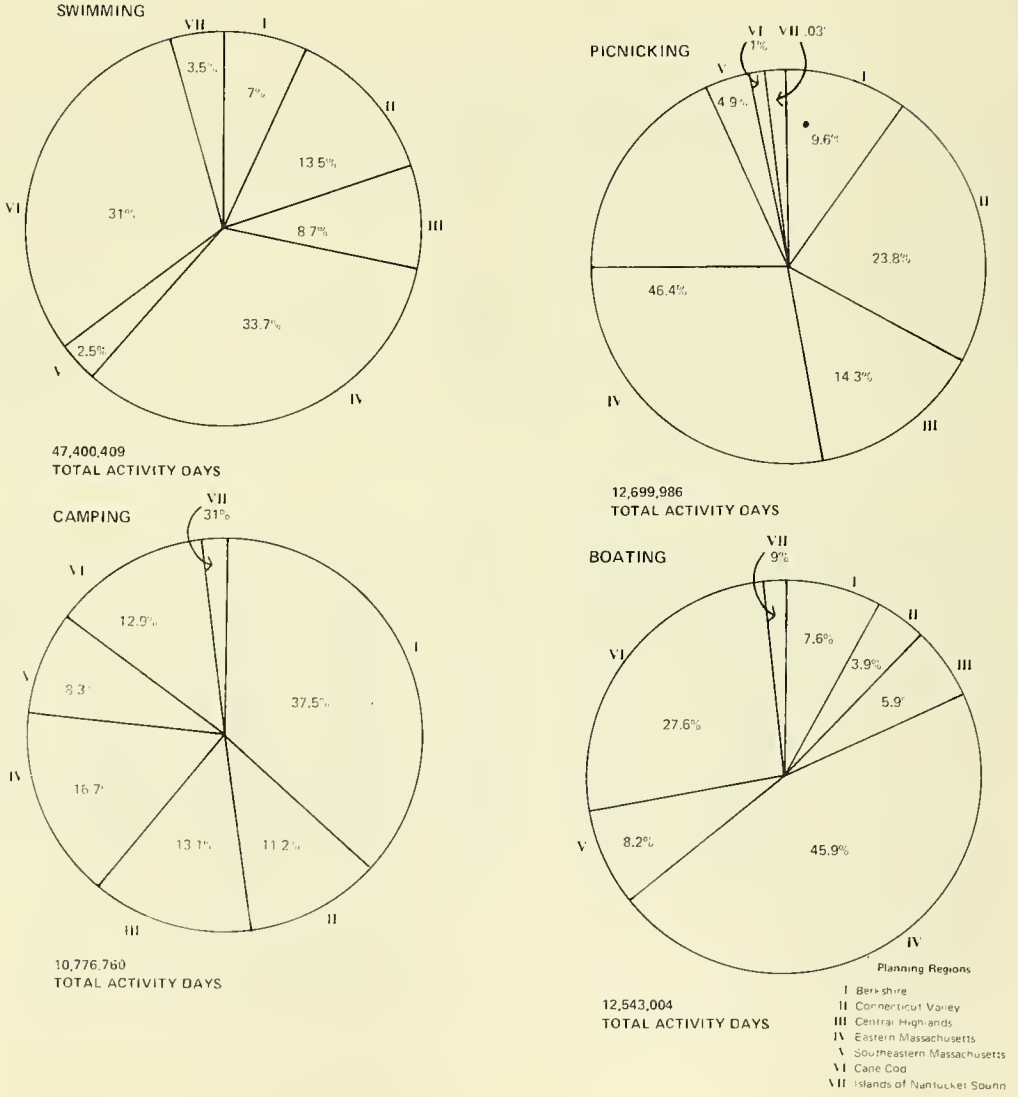


Table VII-1.
Percent Distribution of Existing Recreation Acres by Ownership Category and by Region, 1970.

Region	Recreation Acres		Percent of Recreation Acres by Ownership Category			
	Total	Percent	Private	Municipal	State	Federal
Berkshire	126,508	18%	22%	4%	73%	1%
Connecticut Valley	182,796	24%	25%	10%	65%	—
Central Highlands	155,995	22%	15%	19%	58%	8%
Eastern Massachusetts	173,325	23%	27%	30%	28%	15%
Southeastern Massachusetts	39,649	5%	29%	17%	54%	—
Cape Cod	58,249	7%	14%	34%	9%	43%
Islands of Nantucket Sound	6,268	1%	31%	14%	55%	—
State Total:	742,790	100%	22%	17%	51%	10%

setts Region also accounted for nearly one-half of the total supply of picnicking and boating facilities. Over 90% of the camping facilities is located in the planning regions of Berkshire, Connecticut Valley, Central Highlands, Eastern Massachusetts and Cape Cod; the Berkshire Region alone accounts for 38% of the statewide supply.

Demand

The regional distribution of estimated demand for the four activities in 1970 is shown in figure VII-2.

A comparison of the 1970 distribution of demand for the four activities shows that the Eastern Massachusetts Region, which contains two-thirds of the state's total population, has the largest share of the total estimated demand.

In 1970 demand for swimming facilities represented slightly more than a third of the total demand for the four activities. It is expected that this pattern will continue in 1985 and 2000.

Figure VII-3 shows the percentage increase in the four activities for 1970-1985 and 1970-2000. In every planning region estimated demand for 1985 and 2000 is substantially higher for all four activities than the 1970 demand. Three regions - Cape Cod, Berkshire and the Islands of Nantucket Sound - show the greatest percentage increase in demand. This situation reflects present and projected use of these regions by large numbers of out-of-state visitors. In addition, these regions receive a large number of in-state visitors from other regions.

Land Needs

The relationship between existing recreation acres and outdoor recreation needs in the Commonwealth has been examined in two ways: a comparison of 1970 recreation acres with 1970 population to determine recreation acres per 1000 population; and a comparison of the location of existing recreation acres and population distribution by density groups within each region.

The *open areas* had the greatest number of existing recreation acres per 1000 population in each region, while the areas of greater population densities had the poorest ratio of recreation acres to population (see table VII-2).

A comparison of existing recreation acres and

Figure VII-2

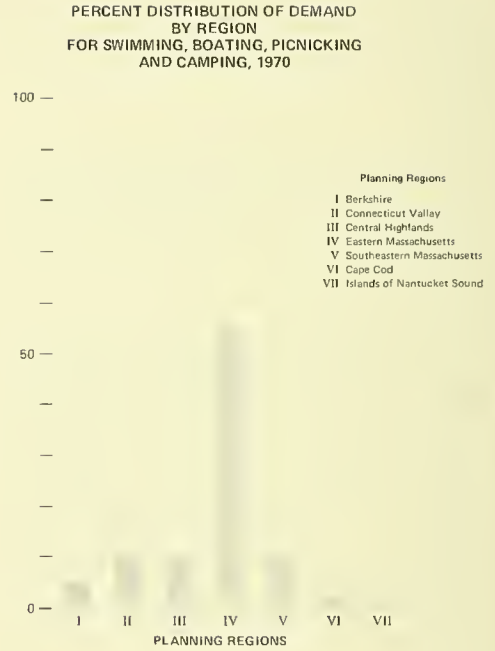


Figure VII-3

PERCENT INCREASE IN DEMAND BY PLANNING REGION FOR 1970-1985 and 1970-2000 FOR SWIMMING, PICNICKING, CAMPING AND BOATING

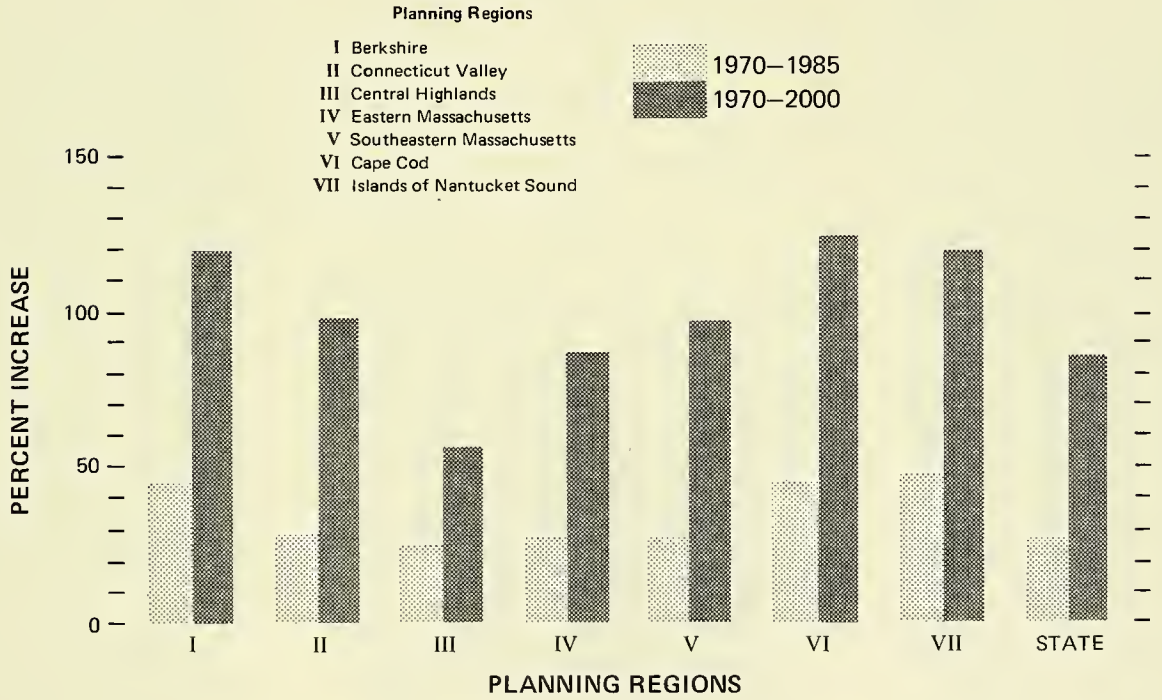


Table VII-2.
Recreation Acres per 1000 Population by Density Group and Region.

Region	Density Groups				
	Extremely Dense	Very Dense	Dense	Less Dense	Open
Berkshire	—	—	85	287	2,987
Connecticut Valley	—	18	75	178	1,886
Central Highlands	—	124	41	187	1,321
Eastern Massachusetts	5	24	48	142	413
Southeastern Massachusetts	—	48	33	71	372
Cape Cod	—	—	—	455	1,578
Islands of Nantucket Sound	—	—	—	548	679

total population in each density group within each region shows the following (see figure VII-4):

1. The areas with lower population densities have a large share of the total existing recreation acres in every region.
2. Conversely, the areas of high population density have a small share of the total existing recreation acres in the region.
3. Approximately one-half of the state's population lives in the *extremely dense* and *very dense* areas, while 91% of the existing recreation acres are located in the *dense, less dense* and *open* areas.

These figures and graphs represent an overall view of the relationship between recreational resources and population in each density group region. However, many diverse types of recreation land were included in the inventory of recreation areas. Although a region may appear to have sufficient total recreation acreage, it may still be lacking lands suitable for certain outdoor recreation facilities and activities. An examination of local areas might reveal that even though the ratio between recreation acres and population distribution looks favorable, there may be deficiencies which are not apparent in the aggregate picture. Facilities and lands to serve local residents may be needed, particularly day-use facilities and neighborhood parks. Other situations which may justify additional land acquisition can be found in the section on Demand-Needs for land in the Regional Analyses.

Open-space standards have not yet been adopted for Massachusetts, although nationally it is generally accepted that the absolute minimum is 10-15 acres per 1000 population in urban areas *(very dense* and *extremely dense* areas in this Plan). Thus, any area with less than ten acres per 1000 population has a deficiency of recreation acreage.

Swimming Needs

Swimming facilities are more urgently needed than those for picnicking, camping and boating. Not surprisingly the greatest deficiency is in the Eastern Massachusetts Region. Both the Cape Cod and Islands Regions have a surplus of facilities when compared to their resident population and projected out-of-state visitation. However, these regions help to compensate for the deficit shown for the Eastern and Southeastern Regions.

Within each region the need for swimming facilities is greatest in high density population areas, partly because natural swimming sites (lake and ocean beaches) as opposed to swimming pools are not generally located in heavily populated areas. Often the water resource is there but is not of sufficient quality to support a swimming facility. Also, in general, swimming pools are not located where the population is most concentrated. A good illustration is the Eastern Massachusetts Region where 67% of the pool capacity is located in the *dense* and *less dense* population areas which contain 43% of the region's population. The *extremely dense* and *very dense* areas, with 56% of the population, have only 20% of the pool capacity. This pattern is even more pronounced in the other six regions. For example, in the Berkshire Region, 75% of the beach and 56% of the pool capacity is in the *open* density areas which contain only 27% of the Region's population.

Because swimming is a day-use activity that often involves a visit to a neighborhood recreation area (less frequently a day's outing in conjunction with other activities), the majority of swimming facilities must be provided where the people are.

It is projected that the statewide need for swimming facilities will nearly double by 2000, suggesting that a much expanded program is necessary at all levels of government and private enterprise if these needs are to be met.

Programs to maintain and improve water quality must play a large role in meeting present and future swimming needs. Water quality at existing and future beaches must be protected to keep them functional. Pollution abatement and water quality programs currently in progress and planned should allow the re-opening of beaches closed because of pollution problems and also the development of new swimming facilities where it is currently not possible.

Recent technological developments in membranous liners and water treatment systems show that there is a potential for providing swimming facilities at lower costs than swimming pools. It appears feasible to create artificial ponds of varying sizes and shapes and subimpoundments in existing streams or lakes, when coupled with newly developed systems to strictly control water quality. The Department of Natural Resources intends to test this approach which could provide swimming facilities at greatly reduced costs.

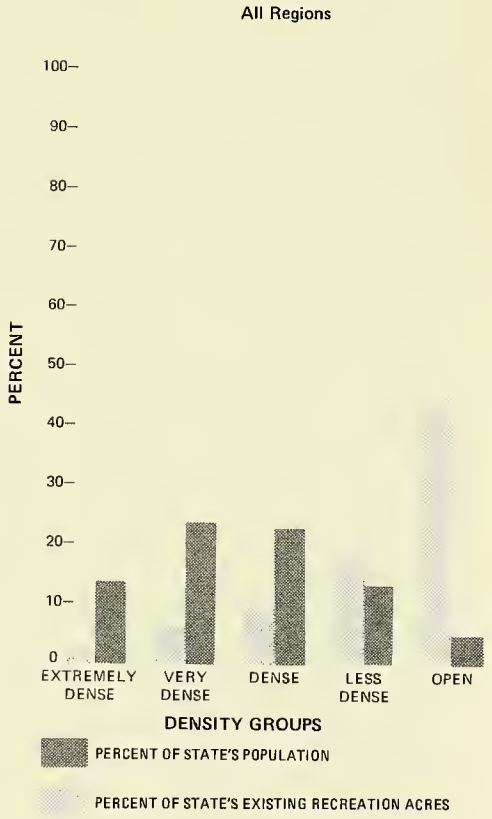
Municipal and private sectors are providing the bulk of Massachusetts swimming facilities. It is recommended that they continue to do so since both groups have the capability for developing facilities where people are. The YMCA and other quasi-public organizations develop many of their facilities in urban areas; private commercial sectors concentrate on heavily used tourist areas. Municipalities usually develop facilities primarily to serve their own resident population. Other government units should develop swimming facilities on their lands wherever appropriate.

Picnicking Needs

The need for picnic facilities follows the same pattern as swimming and is greatest within and near urban areas, with the largest deficit in the Eastern Massachusetts Region. None of the seven SCORP regions has a surplus of picnicking facilities when all density groups are considered. In fact, the only surplus projected for any planning region density group is the Connecticut Valley Region *open* density area. However, since picnicking is often part of a day's outing to the country, this surplus in the *open* area is probably used to satisfy unmet needs of other density groups in the Region.

Figure VII-4

PERCENT OF STATE'S EXISTING RECREATION ACRES AND TOTAL POPULATION BY DENSITY GROUP, 1970



This need relationship evolves from the fact that the supply of picnicking facilities does not follow the population pattern any more closely than do swimming facilities. For example, in the Eastern Massachusetts Region the *very dense* area contains 26% of the population and only 1% of the picnic facilities. Conversely, the *open* and *less dense* areas have 15% of the population and 45% of the facilities. This pattern generally holds true for each of the regions.

It is difficult to estimate how many acres of land or formal picnic facilities (such as tables and fireplaces) would be required to meet these needs, since much picnic activity is carried on without formal facilities and may involve just a blanket spread on the sand, a park bench, a roadside turnout, or a city plaza in which to sit and eat one's lunch. At this point demand-needs for the formal and informal picnic activity cannot be separated. Outdoor recreation programs should recognize that both types of picnic activity are needed. Providing for informal picnic activity might only require supplying a trash can.

Projecting 1970 needs for picnicking facilities to 1985 and 2000 produces a similar pattern of regional and density group deficiencies, with the balance of need between regions remaining about the same. Total needs are expected to nearly double by 2000.

For the most part municipal and private sectors are providing picnic facilities, although in certain population density group areas within an individual region the state is playing a large role. Examples

would be the *extremely dense* Eastern Massachusetts Region area, which reflects the Metropolitan District Commission's program, and areas where the Department of Natural Resources has one or more major park or forest sites. Since most picnic facilities should be provided in or near urban complexes, it is proposed that the municipal and private sectors continue to play a dominant role, with other government agencies providing picnic facilities on their lands as appropriate. In addition, the state's role should include development of picnic facilities at roadside rest and turnout areas on state highways. As scenic roadway programs develop, the need for roadside picnic facilities will increase.

Camping Needs

Camping needs are greatest in the Eastern Massachusetts Region and the higher population density groups of other planning regions. The Berkshire Region is the only region showing a surplus, although the *open* density areas of the Connecticut Valley and Cape Cod Regions also have a surplus which is more than offset by deficits in higher density groups of these regions. The surplus facilities in the Berkshire Region are located in *open* areas and more than compensate for a deficit in *dense* and *less dense* areas of the Region.

As reflected in the need pattern, the Commonwealth's camping facilities are heavily concentrated in *less dense* and *open* areas. The 1970 inventory reveals that there were no camping facilities in the *extremely dense* areas of Eastern Massachusetts and that only 2% of the Region's facilities were located in *very dense* areas. These two density groups contain over 2 million people, or 55% of the Region's population. In the Southeastern Massachusetts Region 66% of the population resides in the *extremely dense* and *very dense* areas which contain only 2% of the state's camping facilities.

The discrepancy between location of facilities and population is not as significant for camping as for picnicking and swimming. Since camping often involves an overnight trip, the distance people will travel is much greater than for day-use activities. In addition, open-space areas enhance camping.

In general, camping facilities should be developed in the *open* and *less dense* population areas. An exception would be the provision of group camping facilities by or for urban youth organizations. In order to facilitate a group camping program a portion of these facilities should be located within hiking distance or be accessible by public transportation. It is recommended that if land resources are allocated for camping in the *very dense* and *extremely dense* population areas, first priority should be given to group camping for youths. The need for camping facilities is expected to nearly double by 2000, with the same general regional and population density relationships holding true.

The private sector is providing most camping facilities in Massachusetts, although in several of the density groups within a region state or municipal governments have the most facilities. It is recommended that the private sector continue to play the major role in providing camping facilities, particularly those of a more elaborate nature that include sewer, water and electric hookups for trailers. Public agencies should continue to provide camping facilities where appropriate on their lands, with emphasis on those supplying only such essential facilities as water and toilets. Public agencies should assume the major responsibility for providing wilderness camping which usually does not lend itself to a profit-making enterprise. Primitive camping is also enhanced by the size and natural features of many public holdings. Quasi-public organizations can also play a large role in providing this type of camping.

Boating Needs

In 1970 all regions, and all density groups within each region, had insufficient boating facilities when comparing demand with parking facilities available. As with the three activities discussed previously, the need for boating facilities is greatest in the Eastern Massachusetts Region, the largest deficits being in the high population density areas. However, boating facility supplies more nearly coincide with population density than do those for camping, swimming, and picnicking.

It is recognized that parking facilities are only one of the criteria required to truly analyze demand-needs for boating. Other crucial factors are: total water surface, total water surface accessible to the general public, and supporting facilities such as marinas and boat rentals.

Private enterprise supplies most of the boating accommodations - parking spaces, marinas and boats-for-hire - although several density groups within certain regions are exceptions to the general trend. Most commonly this variance occurs when public agencies are playing a significant role in supplying parking spaces.

The major public agency role involves the provision of access to water bodies currently inaccessible to the public. This responsibility includes the provision of launching and parking facilities. Private commercial enterprises should continue to play the major role in marinas, boats-for-hire and other items which can be provided on a profit-making basis.

Other Activity Needs

Camping, picnicking, boating and swimming needs have been discussed in detail in the preceding section. However, needs for other recreation activities exist and are recognized. At this state in the planning process it is not possible to discuss these

needs on a regional basis because of data limitations previously mentioned. Thus this section presents an overview of the supply and demand-need for these activities on a statewide basis. The intent is to cover most of the outdoor recreation activities which are popular in Massachusetts. Each of the activities will require additional study to determine a precise estimate of needs and priorities. Undoubtedly, many new activities will become popular in the future. Since it is impossible to fully anticipate future demands that may be placed upon the state's recreational and natural resources, it is suggested that public agencies continue to acquire lands when appropriate and retain them for future development, thus maintaining a flexible position to meet new recreational needs as they occur.

RECREATION VEHICLES

Snowmobiles, trail bikes, minibikes and all terrain vehicles are classified as recreation vehicles. Snowmobiles and trail bikes, in particular, have become very popular in Massachusetts in the last few years, so popular that since 1970 off-road vehicles are required to be registered. The number of off-road vehicles has jumped from 17,000 in 1970 to 32,000 in 1971. It is estimated that at least 30,000 of these were snowmobiles. Trail bikes, used both on and off the road, are registered as motorcycles. The number of motorcycles in the state has risen from 30,900 in 1966 to 44,900 in 1970. About 25% of these are estimated to be trail bikes.

Recreation vehicles stimulate people to take advantage of the outdoors, especially in the winter. Characteristics of these recreational vehicles include mobility, range, noise and speed. Due to their mobility and range, they require not only trails but also large amounts of open space. In terms of wear and tear, recreation vehicles can have a devastating impact on soil and vegetation. Their growth in popularity, without corresponding regulation of use, has intensified the conflict with many land uses, including recreation use of open-space, park and forest lands.

A 1970 Department of Natural Resources trail inventory identified 865 miles of snowmobile trails and 91 miles of trails for other off-road vehicles. Not included were many unofficial trails such as old roads and utility rights-of-way. Two factors complicate any estimation of available trail land: 1) trails on private property are not available to everyone and most likely, as recreational vehicle use grows, more private land will be restricted, and 2) these activities can occur on almost any open-space land where they are permitted. It is assumed that many private lands would be made available to recreational vehicles if owners were assured user fees and limited liability.

State agencies own a substantial amount of land that could be used for snowmobiles and trail bikes. This trail potential can be further increased if other public agencies, municipalities, public organizations, and private companies cooperate in developing connecting trails between recreation and open-space lands. Also of crucial importance is the fact that recreation vehicle trails should be located: 1) separate from other types of trails, 2) on terrain that can stand up to the hard wear and tear, and 3) where they will be compatible with the surrounding landscape, land use and other recreation functions.

The Department of Natural Resources' Division of Forests and Parks, in conjunction with the Massachusetts Trails Advisory Committee, has initiated a program to develop a statewide trail system. To date Forests and Parks has completed a trail classification and marking system which is currently being implemented. If an effective statewide trail system is to be established, it will require the efforts of not only state agencies but local governments and private-user groups as well.

PLEASURE DRIVING AND SIGHTSEEING

In Massachusetts pleasure driving and sightseeing have always been high on the list of outdoor activities. The combined state highway and local road system contains more than 31,000 miles of roadway. Much of the highway system is scenic and includes ocean views, quaint New England villages, rural farmlands, tree-lined suburban areas, and Boston's skyline. The Department of Public Works' Outdoor Advertising Board, whose function is to insure that scenic roadsides are not defaced by unsightly and excessive advertising signs, assists in the prevention of visual pollution.

In order to maintain and enhance present opportunities for pleasure driving and sightseeing, the following suggestions are made:

1. That the state continue the State Scenic Roads Study begun in 1964 with the aim of creating a system that will link recreation areas, scenic attractions, historical sites and other points of interest.
2. That the state's highways continue to be maintained at a high level and landscaped to provide scenic roadways.
3. That rest areas, or pull-off areas for viewing scenic points of interest, be made an integral part of the state scenic road system.
4. That roadside beautification be accelerated through the speedy removal of billboards and the screening off of junk yards and other unsightly areas.

BICYCLING

The bicycle is returning as an increasingly popular form of transportation and recreation. In 1900 there were 10 million bikes in the United States; by 1971 the number had jumped to 30 million. The upsurge of interest in cycling has brought about a concurrent growth in demand for bicycle paths or roads.

Major bicycle facilities available now in Massa-

chusetts include the Dr. Paul Dudley White Bike Route which runs along the Charles River in Cambridge; the newly-created Boston Greenbelt Bikeway which stretches in a seven-mile arc from Boston Common to Franklin Park; a three-link recreation bike trail in Springfield; the New Bedford Bikeway; two major bikeways on Nantucket; an eight-mile bike route running along the Cape Cod National Seashore; and major bikeways in Pittsfield, Holyoke and Stockbridge. Other bicycle facilities include the beach ride to Castle Island; a 22-mile ride along the Ipswich River; a 20-mile ride along the Merrimack River; and rides through the Blue Hills Reservation.

Concord is currently planning a historic bikeway to be completed for the United States Bicentennial in 1976. It will connect the Concord battleground with the Antiquarian House, the Orchard House, and the homes of Ralph Waldo Emerson, Louisa May Alcott, Henry David Thoreau, and Nathaniel Hawthorne.

Several specific cyclist needs should be considered. A commuter cyclist requires hard surfaces, preferably paths designated exclusively for bicycle use or roads with minimum traffic flow. In metropolitan areas where this allocation may not be feasible, one lane of a road should be reserved for bicycles and all automobile traffic prohibited. Bicycle parking facilities should also be provided at appropriate places. The pleasure cyclist has a somewhat different need. His major concern is the surrounding environment, and therefore all parks, forests and reservations, or scenic roads in rural areas, are ideal trail locations. Trails should be well marked and provide parking and other facilities where appropriate.

The need for bikeways and cycle paths in the state is recognized and plans are under way at federal, state and municipal levels to increase the supply. The revival of bicycling can substantially alleviate transportation problems and improve public health.

HUNTING

In urban Massachusetts hunting interests make a considerable demand on public lands. In 1970 licenses were issued to 120,000 hunters. As land continues to be developed for residential, commercial, industrial and related purposes, the amount of suitable land available for hunting activities declines. Thus we have an increasing demand for a consistently decreasing supply. Much of the demand can be, and is met through an active program of public land ownership primarily for hunting purposes, use of other public lands on which hunting is compatible with the primary use, and leasing programs to make private lands available.

Needs for hunting exist statewide. The hunter is willing to travel considerable distances to participate in his sport. However, the pressures are greatest near urban areas where open space for any purpose is limited. Fortunately for the hunter his sport can often be pursued on so called "marginal lands," such as marshes and wetlands, which are numerous in eastern urban sections of the state. Wetland acquisition and public access programs must be accelerated, not only to provide land for hunting, but, in the case of wetlands, also to conserve water, prevent floods, and protect fish and other wildlife.

Acreage and availability alone do not always indicate that demand is being satisfied. A good hunting area requires not only wildlife resources but also proper environmental conditions under which wildlife can survive and flourish. To balance pressures placed on game resources, artificial stocking programs, which help insure an adequate supply of desirable species, are often required. Pheasant and quail, for example, profit significantly from artificial stocking. These so-called "put-and-take" operations provide much recreation for hunters and are justified by a hunter's enthusiasm for his sport and his willingness to underwrite the necessary costs of a stocking program.

There is a need for an expansion of programs to make hunting safer and more satisfying. Opportunities to learn safer hunting practices, identify wildlife, and engage in proper hunting techniques are examples. Sportsmen's clubs have been, and hopefully will continue to be very significant allies in this effort.

Activities such as bird watching and wildlife photography are being enjoyed by increasing numbers of people, especially in or near urban centers. These activities should be promoted by the management of wildlife in areas where they can be observed and studied, including areas adjacent to picnicking and camping facilities as well as those along roadways in rural and scenic parts of the state. This effort would involve both habitat and animal management, since even with "put-and-take" stocking programs wildlife will only remain in an area when conditions are suitable for survival.

HIKING

According to the Statewide Trail Inventory conducted by the Department of Natural Resources in 1970, the Commonwealth has 247 hiking trails totaling 636 miles. Most of these trails are used primarily for hiking, although some are used for horseback riding and skiing. It is estimated that about 60% of all hiking activity takes place on public lands. Since many hikers like to climb mountains in order to get a panoramic view of the landscape, public ownership of mountaintops and other points of high elevation has encouraged the growth of hiking on public lands.

The state's major trail system, which also has national significance, is the Appalachian National Scenic Trail. The entire Massachusetts section of the Appalachian Trail is in Berkshire County. It is ap-

proximately 83 miles long and extends from the Vermont-Massachusetts border to the Connecticut border. With the passage of Chapter 627 of the Acts of 1969, Massachusetts became the first state to pass legislation to protect its portion of the 2050-mile trail.

The growing demand for hiking has placed increasing pressures on public lands to provide trail systems. A persistent problem is the conflict between hiking and newer trail uses such as snowmobiling and motor biking. This problem underscores the need for planning and developing a trail system on public lands that can accommodate all trail users.

Another aspect of the growing demand for hiking is the renewed interest in primitive camping which was, until very recently, a dormant outdoor activity in Massachusetts. The advent of the snowmobile, however (coupled with improved camping equipment), has stimulated some winter camping demand for primitive or wilderness areas accessible only by snow vehicles. At present there is minimal opportunity for primitive camping on private and public lands. However, the Department of Natural Resources is currently planning a number of campsites throughout the state which can only be reached by foot trails.

Through Chapter 589 of the Acts of 1970, which sets up the statutory authority and funding for purchase of trails in Massachusetts, the Commonwealth has established a basis for providing a statewide trail system. The law empowers the Public Access Board in the Department of Natural Resources to establish trails and paths for hiking, skiing, snowmobiling and other recreational uses. Trail lands can be acquired by eminent domain; acquisition can be funded by a portion of snowmobile and other recreational vehicle registration fess.

The Massachusetts Trails Advisory Committee, established in 1969, advises DNR on trail matters. It has 15 members representing trail users and conservation interests. It is anticipated that a subcommittee specializing in urban trails will be formed soon.

The DNR has made several proposals aimed at facilitating the establishment and management of a statewide trail system. Among these are the Landowners Liability Study, a proposal to encourage the opening up of private land for recreation use; the Recreational Trails Policy, a guideline for developing compatible trails on DNR lands; and the 1970 Recreational Trails Study which recommends that a statewide recreational trail system be established "based on the concept of multiple use connection trails linking together trail networks of nonconflicting uses, primarily on publicly owned property."

HORSEBACK RIDING

According to the Massachusetts Department of Agriculture there are about 16,600 horses in the state. Although specific figures are not available, it is assumed that most of these are saddle horses. About one-third of the horses are located in Middlesex and Worcester counties, possibly indicating that horseback riding is a popular suburban activity.

The Statewide Trail Inventory of 1970 lists 515 miles of primary bridle trails as well as 1836 miles of secondary bridle trails (trails used primarily for hiking, bicycling or fire lanes). Approximately one-half of all these trails are publicly owned.

As private lands are withdrawn for other land uses or become restricted, the increased demand for bridle paths must be satisfied by utilizing public lands. To help meet this growing need, DNR is now marking bridle trails on state lands and planning new riding paths.

GOLF

Few recreational activities requiring significant capital expenditure have experienced the increase in popularity that golf has. In Massachusetts there are approximately 250 golf courses ranging from nine to 36 holes. In addition to providing recreation activity, golf courses are valuable as large open-space areas. An average 18-hole course is between 130-150 acres in size.

For the immediate future it appears that the demand for golf course courses will expand proportionately to population growth and increases in available leisure time. Based on excessively heavy play and over use found at many courses, it is evident that present demands are not being met.

The responsibility for providing golf facilities should rest with the private sector and municipalities. The state can assist by allowing long-term lease arrangements for building golf courses on state lands by private investors if the land to be used is considered as surplus for other public recreation needs and if golfing is considered to be the highest and best use of that land. The state can also encourage municipalities to provide these facilities through financial assistance programs.

FISHING

Fishing, including ice fishing, is highly popular in the Commonwealth. In 1970 the state issued 225,000 fishing licenses. It is estimated, in addition, that one-half million nonlicensed youths enjoyed fishing and that at least 250,000 anglers fished in the coastal waters. In Massachusetts there are extensive salt and freshwater fish resources. Of prime concern are: 1) access to fish resources by both boat and shore fishermen, and 2) establishment and maintenance of fish populations.

Programs designed to enhance or supplement present sport fishing resources should continue. Among these are rearing of trout, a species capable of limited amounts of natural reproduction in most Massachusetts waters; leasing of shore rights; and anadromous and saltwater fish restoration pro-

grams.

Existing accesses to coastal waters and freshwater ponds and streams should be preserved and new access points should be acquired, with priority given to shoreline accesses. Many people in the lower-income brackets enjoy fishing but do not own a boat and thus need adequate shore access.

Facilities such as fishing piers and jetties should be developed to enable people to take advantage of the best fishing areas without large investments in fishing gear. Massachusetts' urban areas, in particular, have a number of water resources which have been largely neglected in past programs. Because of the urgency of urban needs, the state should assist in the development of programs which will provide public access, develop facilities, and promote fishing in densely populated areas.

Increased provision for shore fishing should not be at the expense of boat access, since more boat access points would help to alleviate pressure on shore resources and open up new fishing areas. Efforts must also be directed toward making the fisherman more aware of the potentials for enjoying his sport. Many lesser known species of fish provide great sport. Their utilization should be promoted in order to lessen the pressure on popular fish species and reduce the supply of abundant, less-sought-after species.

SKIING

Massachusetts has 45 ski areas: 17 in the Berkshire Region, 20 in the Central Highlands, and eight in the Eastern Massachusetts Region. Southeastern Massachusetts, Cape Cod, and the Islands of Nantucket Sound Regions have no skiing facilities because of insufficient snow. Massachusetts' ski season averages 100-110 days. Night skiing is provided at 28 of the 45 ski areas and snowmaking at 30.

Because of extremely undependable natural snow conditions in Massachusetts, artificial snow-making equipment is an essential part of a ski area operation. If a ski area depends exclusively on natural snow, the consequent fluctuating demand involves a high financial risk for ski area operators. Another factor influencing the demand for downhill skiing is the rising cost of ski-lift tickets at most ski areas. This substantial expenditure tends to limit skiing to middle and upper income bracket people. A third factor affecting the demand at Massachusetts' ski areas is the distance people are willing to travel to the area of their choice. A large portion of skiing demand generated by Massachusetts residents is satisfied out-of-state. A survey of four New Hampshire ski areas showed that approximately 50% of the skiers using the areas were residents of Massachusetts. In Vermont the figure decreases to 20-30%. Massachusetts' ski areas also meet some of the need from surrounding states. For example, 40% of the skiers at Mt. Tom in Holyoke come from Connecticut and ski areas in the Berkshires attract people from New York and Connecticut.

In Massachusetts skiing facilities are mainly provided by private enterprise; only three of the 45 ski areas are owned by the state. Because of unpredictable weather conditions, financial risks involved, and the limited land resources remaining in Massachusetts for developing ski areas, it would seem best to emphasize expansion of existing areas (wherever feasible) rather than the building of new areas. It is also important to stress the need for multipurpose year-round use of ski areas for winter sports such as ice skating, sledding, snowshoeing and ski touring. These areas could also be used for summer camping. Chair lifts could be used to transport people to mountaintops for berry picking, picnicking or sightseeing. Without this multiple use many ski areas will be inactive throughout a large portion of the year.

Cross-country skiing has been increasing over the past few years. Trail system planning should take this activity into account.

ICE SKATING

Hockey, ice skating, and figure skating are among the most popular winter activities, indoors, or outdoors, in the state. Demand for skating facilities is so great that some of DNR's rinks are operated 22 hours a day, seven days a week. In 1968 some 600,000 people skated at Metropolitan District Commission rinks; last year 1,000,000 people skated at these rinks.

Currently MDC has 24 rinks either in operation, under construction, or planned; in a similar context DNR has 19 rinks. In addition there are 56 rinks operated either by municipalities, schools or private owners. MDC estimates that eight additional rinks are needed to meet demands in the metropolitan Boston area. This figure is calculated on the basis of one rink per 10,000 people under 18 years of age.

Indoor rinks expand the amount of time that an area can be comfortably and safely used; however, they are costly to build and maintain. Careful consideration should therefore be given before deciding whether to build an outdoor or indoor rink.

To meet skating needs more effective use of natural ice should be made by municipalities and private groups. For example, utilization of natural ice areas can be increased by providing snowplowing and comfort stations, parking, lighting and heated warm-up sheds. In some cases a roof can be placed over a flooded surface to eliminate plowing. Facilities could also be constructed for summer use, making them an economical multiseasonal investment.

Special Problems

In recreation planning consideration must be

given to problems of special groups that, for one reason or another, cannot take advantage of recreational opportunities available to the general public. It is often assumed that the responsibility for providing recreational opportunities involves nothing more than the assurance of equal opportunity for all to participate in programs and activities. However, people's ability to take advantage of these opportunities varies. Equal opportunity participation is not always possible for those who lack the knowledge, attitudes, skills, habits and financial resources of the more affluent. These conditions are further complicated by the fact that the less affluent tend to concentrate in urban areas where recreational opportunities are fewer and of lesser quality.

THE URBAN AREAS

As part of this planning project a special study aimed at identifying and investigating urban recreation problems was initiated. The findings of this study which included an analysis of the Boston metropolitan area as a whole and a more detailed case study of the East Boston neighborhood, are published in detail in the Eastern Massachusetts Region Supplemental Report. Findings from this report are incorporated in the discussion of urban recreation needs which follows.

In 1970 the state's urban population represented 85% of the total state population. This urban population is concentrated in the eastern section of the state, while the western areas are largely open or undeveloped and have low levels of population density. Thus the state's problem in meeting resident demand for recreation is focused on the eastern area, while much of the state's recreation resources are located in the western area.

The major urban centers constitute the greatest areas of need, and within them the higher density inner core areas have the greatest deficiencies. However, the suburbs surrounding the urban complexes must not be neglected. Many of these areas, growing without adequate planning and provision for recreation and open-space areas, are often proceeding along the same disastrous path the urban centers have followed — resources are not effectively utilized and valuable natural resources are being lost to other land uses.

A major problem facing urban areas is poor maintenance of existing resources. Some city neighborhoods have sufficient recreation acres but many of these lands have been neglected or do not receive regular maintenance. A less severe problem, but one which tends to limit the use of recreation areas, is the monotonous design of many city parks and playgrounds. Outdoor recreation needs in one neighborhood may be different from those in another neighborhood and the planning and design of areas and facilities should reflect this difference.

Within the urban area difficulties arise in meeting the needs of special groups. The most obvious special groups are the poor, the physically or mentally handicapped, different racial and ethnic groups, the elderly and the very young. To a considerable extent, existing facilities have been planned to meet the needs of teenagers or young and middle-aged adults. In order to meet the needs of all of its citizens effectively, municipal governments should strive to consider the diverse backgrounds of their neighborhoods when planning, designing and constructing recreation areas.

Educated, upper income persons who have automobiles or access to cars do not constitute a difficult problem since, for the most part, they are able to satisfy their recreation needs without recourse to special programs or facilities. They generally have access to a greater range opportunities within the urban area and generally take advantage of these opportunities to a greater extent than do the special groups.

Because of the densely settled nature of much of the state's urban environment and the need to meet at least a portion of the recreation demand within heavily developed areas, it is necessary to consider recreation in both urban and suburban or rural areas. For example, a Boston resident who has no means of traveling to an area outside the city may have no hesitancy about picnicking on Boston Common. But a suburban resident would rarely think of going to the city to picnic. The urban dweller may have adopted different concepts of recreation which, to some extent, have probably been forced upon him by necessity. For example, in some neighborhoods major highways, railways or heavy traffic make existing recreation areas inaccessible to the people in the area.

The general imbalance between the location of supply and population demand becomes a very specific problem within the city, and especially within neighborhoods or small residential units. Concentrated urban slum areas are often neglected when it comes to the provision of many kinds of public services and facilities, including recreation. The severity of the deficiency varies considerably from area to area and from group to group. It is clear, however, that the bulk of the demand for recreation lies in areas where population concentrations are greatest. The urban areas thus constitute a major concern and responsibility for every level of government and for the private sector.

THE ELDERLY

In 1970 approximately 11% - one person in nine - of the state's population was 65 or over. Compared to the other 49 states, Massachusetts ranks eighth in percent of the population over 65. Among the elderly in Massachusetts females greatly outnumber males. Nearly half of the state's senior citizens (310,000) live in the Boston metro-

politan area, while another 99,000 live in the Worcester and Springfield-Chicopee-Holyoke metropolitan areas.

The elderly not only have the problem of age but many also are living on a low income, suffer from physical infirmities, and are unable to drive an automobile even if they can afford one. Additional obstacles include emotional and social problems experienced by this age group in a youth-oriented society. In most recreation programs this youth orientation, especially toward teenagers and young adults, results in neglect of the aged's needs, interests and physical limitations.

The fact that approximately two-thirds of the state's elderly live in urban areas represents a special problem because they often feel that the urban environment is hostile. Many elderly people fear going to city parks, walking the streets, or engaging in shopping.

People in this age bracket usually require special types of recreational facilities geared to passive activities. Often the facilities which they would find the most pleasant and useful are inexpensive to acquire or construct. Horseshoe pitching, checkers, shuffleboard, bocce, gardening, or sitting and conversing on a park bench are some of the pastimes in great demand by the elderly. These activities do not require lavish facilities, large areas or costly maintenance. However, to ensure full satisfaction of the recreation needs of this group, effective programs including transportation to recreation areas, education programs to inform the elderly of their opportunities, and encouragement to help them take advantage of them, must also be established. Most important, provision of security at recreation areas is essential if the elderly are to feel safe and protected.

THE HANDICAPPED

For planning purposes it is often assumed that approximately 4% of the state's population has some form of physical or mental handicap because a more precise figure is not available. This group's enjoyment of recreation is often as great if not greater than that of the non-handicapped. In order to satisfy the needs of this group, special programs and facilities must be established. These should include special programs such as: 1) outreach programs to make people aware of the facilities available, 2) transportation of groups to recreation areas, 3) instruction in use of facilities, and 4) provision of special facilities such as special doors, ramps and toilet facilities. Agencies responsible for providing recreational facilities for the handicapped should consult and work closely with agencies responsible for helping the disabled.

THE DISADVANTAGED

Depending on the income level chosen, probably one-sixth to one-third of the state's population (one to two million people) can be designated disadvantaged. Although based on income level, the criteria for disadvantaged should be widened to include social and educational deprivation. For example, "poor" college students differ significantly in recreation needs and patterns from welfare families with similar income resources. Many of the poor do not have a car or access to private transportation. In addition to income, other problems of the disadvantaged are lack of education and experience, and traditional ways of living. The social experiences of many of the poor fail to provide them with the ability to take advantage of available resources. It is insufficient simply to provide a facility in a slum or low-income area. Programs of education and outreach must also be instituted to inform and educate people about the nature and potential of the facilities.

These factors have an impact on recreational participation and they are reflected in the 1970 Boston Area Study which revealed that the rate of participation in swimming drops sharply in families with an annual income of less than $6,000. This trend is significant because swimming is more often available, requires no great personal outlay, and is better known to the urban resident than most other activities. Participation in other activities drops off even more sharply for low-income groups because facilities are not readily available within urban areas and more remote facilities cannot be easily reached.

It can be hypothesized that disadvantaged persons constitute a substantial latent demand for outdoor recreation. Participation can be stimulated if the requisite facilities and special outreach and educational programs are made available.

SUMMARY - SPECIAL GROUPS

It is virtually impossible to define all the different recreational needs of the "special groups" within the scope of this report because of the different problems of each group: infirmities of the elderly, various types of disabilities of the handicapped, social and psychological problems of broken families, and racial or language problems of ethnic and minority groups. Each of these groups must be considered in detail and programs created to deal with its problems. The Continuing Planning Program will give high priority to these programs.

A dual approach, linking the specialized problems of all these groups with the general needs of the urban resident, should be considered. This would involve: 1) a program of enrichment (designated especially for young children, the elderly and the handicapped) that would provide transportation, outreach, education and additional facilities within the urban area and preferably within the neighborhood or subneighborhood; 2) a program linking urban population areas with recreational

areas on the metropolitan fringe through outreach, education and other programs, and especially through convenient safe public transportation systems that would convey teenagers, young adults, the elderly and the handicapped to the fringe recreation areas.

Environmental Quality

In a heavily populated urban state such as Massachusetts the conservation and preservation of natural resources is a pressing problem. Many of the state's unique cultural and physical resources have already been lost and many more are threatened. In the past few years efforts to reverse this trend have been effective. Massachusetts can take pride in the fact that several programs to protect natural resources were initiated by the Commonwealth. Notable among these are the establishment of conservation commissions and legislation protecting coastal and inland wetlands. Yet much remains to be done.

Effective action is required not only in the enforcement of existing legislation but in the enactment of new and stronger environmental programs. Although no area of pollution or environmental abuse should be ignored, certain problems should receive high priority in order to upgrade the environmental quality of our lives. These priorities include, but are not limited, to:

1. improved water pollution control at the source and water quality management to provide more opportunity for recreation and sightseeing.
2. stronger air pollution and noise pollution legislation to improve the health and tenor of our environment, especially in the state's urban areas.
3. land-use regulations to prevent environmentally unsound development of land and water areas.
4. protection or regulated use of fragile, threatened areas.
5. billboard control to prevent and correct visual pollution of the state's scenic and urban areas.
6. protection and appropriate development of the Commonwealth's islands.
7. identification and protection of rare and endangered plant and animal species.

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PROGRAMS

To assess their impact, major outdoor recreation and open-space programs have been analyzed and tabulated. These programs have been separated into three types: projected five-year acquisition and development programs; funding programs; and other significant programs.

Acquisition and Development Programs

Available information concerning the five-year acquisition and development programs of public agencies is presented for each level of government. It must be recognized that these figures are estimates only and the costs and project implementation dates shown are subject to change; and that many of these program projections are based on anticipated funding levels. Any increase or decrease in funds available will necessitate program revisions. Further details concerning the programs and past accomplishments can be found in the Responsibilities and Programs Chapter.

FEDERAL

The federal government has several agencies administering significant outdoor recreation and open space programs in the Commonwealth.

National Park Service

The National Park Service within the Department of Interior owns and administers the Cape Cod National Seashore and several national historic sites including the 500-acre Minuteman National Historic park. The authorized acquisition and development program for these areas is shown in Table VIII-1.

The National Park Service's program for the years 1972-76 encompasses two regions, the Eastern Massachusetts and Cape Cod Regions, representing regions of highest resident and high nonresident demand respectively. The Park Service's proposed program is oriented toward renovation, restoration, and interpretation of the historic and cultural resources of national significance in the Commonwealth. It also includes the acquisition of an additional 4361 acres. While additional lands may be acquired, such acquisitions have not been authorized by the U.S. Congress.

Bureau of Sport Fisheries and Wildlife

The Bureau of Sport Fisheries and Wildlife in the Department of the Interior owns and administers several national wildlife refuges in Massachusetts. The projected five year acquisition and development schedule for these areas is shown in Table VIII-2.

The five year program calls for acquisition of an

Table VIII-1.
Schedule of Acquisition and Development
National Park Service, 1972-76

Planning Region	Year	Acquisition[1]		Development[2] Cost[3]
		Acres	Cost	
IV	1972	32	$ 415,000	$ 505,000
	1973	200	2,700,000	1,103,800
	1974	—	—	488,500
	1975	—	—	3,004,500
	1976	—	—	564,000
Region Total		232	3,115,000	5,665,800
VI	1972	2,479	4,200,000	200,000
	1973	1,650	7,000,000	—
	1974	—	—	74,000
	1975	—	—	—
	1976	—	—	419,000
Region Total		4,129	11,200,000	693,000
Grand Total		4,361	$14,315,000	$6,358,800

Source: U.S. Department of Interior, National Park Service.
[1]Includes only acquisitions authorized by Congress
[2]Includes renovation and restoration of historic sites and buildings, interpretive facilities and exhibits, access roads and parking, beach houses and dune-stabilization.
[3]All acquisition monies from Land and Water Conservation Fund.
All acquisition monies from appropriations.

additional 1206 acres at two refuges, Parker River and Great Meadows. Recreational development will include wildlife and nature trails, sanitary facilities, access roads, parking facilities and boat launching. The Bureau's program is concentrated in the Eastern Massachusetts Region but includes one proposed project in the Southeastern Massachusetts Region.

Army Corps of Engineers

The Army Corps of Engineers in the Department of Defense develops recreational facilities on some of its lands. The projected five-year acquisition and development schedule for these areas is tabulated by year and region in Table VIII-3. In addition, the Corps has granted licenses to the Department of Natural Resources' Division of Fisheries and Game, to develop wildlife management areas on several thousand acres of reservoir lands. Also the Corps has leased land to the Department of Natural Resources' Division of Forests and Parks, for the planned addition of 160 campsites in the Cape Cod Canal area.

The Corps' five-year program calls for acquisition of reservoir lands at the Whitmanville Lake and Nookagee Lake project, a combined total 1156 acres. Both of these projects will provide some recreational opportunity, although recreation is not the major purpose of the acquisition. The development program will add camping, picnicking - swimming and other day-care facilities for children.

Soil Conservation Service

The Soil Conservation Service in the U.S. Department of Agriculture makes cost sharing grants to local project sponsors under the small watershed program (P.L. 83-566 as amended) for land acquisition, easements, rights-of-way and facilities needed to develop the water-oriented potential of the small watershed project.

The state Department of Natural Resources through its Divisions of Fisheries and Game, Water Resources and Forests and Parks participates in this program as the local sponsoring agency. The Water Resources Division is the contracting agency for structural improvements.

The projected acquisition and development program for the years 1972-76 is shown by region and year in Table VIII-4. The Public Law 566 program in Massachusetts is concentrated in Regions I and II. Anticipated are 13 projects with a federal cost share of over $5,000,000. Projected land acquisitions are shown under the program for the appropriate division in the Department of Natural Resources. Projected development costs include flood control structures as well as recreation.

Table VIII-2.
Schedule of Acquisition and Development - Bureau of Sport Fisheries and Wildlife, 1972-76

Planning Region	Year	Acquisition		Development		Anticipated Fund Source
		Acres	Cost	Type	Cost	
IV	1973	548	$370,000	sanitary facilities, trails access roads	$247,000	appropriation
	1974	558	300,000	exhibit facility	30,000	appropriation
	1975	100	185,000			
Region Total		1,206	855,000		277,000	
V	1974		—	exhibit	30,000	
Grand Total		1,206	855,000		307,000	

Source: U.S. Department of Interior, Fish and Wildlife Service Bureau of Sport Fisheries and Wildlife. Nothing proposed for 1972 or 1976.

Table VIII-3.
Schedule of Acquisition and Development - Corps of Engineers, 1972-76

Planning Region	Year	Acquisition		Development		Anticipated
		Acres	Cost	Type	Cost	Fund Source
II	1973	—	—	group camp site	120,000	appropriation
	1974	—	—	boat launch, parking	102,000	appropriation
Region Total					220,000	
III	1972	—	—	sanitary facilities	40,000	appropriation
	1973	644	940,000	camping, day-use shelter	235,000	appropriation
	1974	512	915,000	—	—	appropriation
	1975	—	—	picnic area, beach, parking	225,000	appropriation
	1976	—	—	picnic area beach, parking boat launch	420,000	appropriation
Region Total		1,156	1,855,000		950,000	
IV	1973	—	—	camping, visitor center	735,000	appropriation
	1975	—	—	camping	565,000	appropriation
Region Total					1,300,000	
Grand Total		1,156	$1,855,000		$2,689,905	

Source: Department of Army, New England Division Corps of Engineers.

STATE

Several state agencies in Massachusetts have significant recreation and open-space acquisition and development programs. The projected acquisition and development programs of these agencies is presented below.

Division of Forests and Parks

The Division of Forests and Parks in the Department of Natural Resources provides a wide variety of recreational opportunity at state forests and parks. In addition the Division operates ocean beaches, swimming pools and skating rinks.

The projected five-year acquisition and development program for the years 1972-76 is shown by year and by region in table VIII-5. In summary the five-year program calls for the acquisition of 16,710 acres at a cost of $29,600,000. Expenditures on day-use and overnight development would total $26,615,000 with $21,450,000 spent on new development and the remainder on rehabilitation of existing facilities. Over 50% of the acquisition cost and about 35% of the development cost is programmed for Region IV, the Eastern Massachusetts Region, where the recreation needs are greatest.

The Division of Forests and Parks has a separate program to build skating rinks and swimming pools on state-owned lands or on land conveyed to the state by the community. The Division currently operates five rinks and seven pools; bond issue money has been authorized for an additional 14 rinks and 13 pools, expected to be completed by January 1974. Approximately $5 million per year is expected to be authorized for continued support of the rink and pool program.

Table VIII-4.
Schedule of Acquisition and Development - P.L. 566 Small Watershed Program, 1972-76

Planning Region	Year	Number of Projects	Project Type					Federal Cost
			Flood Control	Recreation	Fish & Wildlife	Water Supply	Low Flow Augmentation	
I	1973	3	x	x	x	x		$2,000,000
	1974	1	x	x				378,000
	1975	2	x		x		x	302,000
	1976	1	x		x			220,000
Region Total		7						2,900,000
II	1973	1	x		x		x	270,000
	1974	2	x	x				1,110,000
	1975	1	x		x			305,000
	1976	1	x		x			202,000
Region Total		5						1,887,000
III	1974	1	x	x				439,500
Grand Total		13						$5,226,500

Source: U.S. Department of Agriculture, Soil Conservation Service

Table VIII-5.
Schedule of Acquisition and Development - DNR Division of Forests and Parks, 1972-76.

Planning Region	Year	Acquisition		Development			
				Rehabilitation		New	
		Acres	Cost	Day-use	Overnight	Day-use	Overnight
I	1972	1,100	$ 1,050,000	—	—	$ 750,000	—
	1974	100	100,000	$ 950,000	—	—	$ 750,000
	1975	100	100,000	—	—	—	—
	1976	75	150,000	60,000	$ 60,000	—	—
Region Total		1,375	1,400,000	1,010,000	60,000	750,000	750,000
II	1972	1,035	1,050,000	500,000	—	—	—
	1973	—	—	—		500,000	500,000
	1974	300	300,000	—	—	100,000	1,000,000
	1975	400	100,000	50,000	—	—	—
	1976	600	600,000	350,000	—	—	—
Region Total		2,335	2,050,000	900,000	—	600,000	1,500,000
III	1972	1,500	1,100,000	1,000,000	—	—	—
	1973	500	300,000	—	—	1,500,000	—
	1974	500	750,000	—	—	—	200,000
	1975	500	1,000,000	—	—	—	—
	1976	—	—	100,000	—	—	—
Region Total		3,000	3,150,000	1,100,000	—	1,500,000	1,700,000
IV	1972	2,300	5,000,000	500,000	250,000	3,500,000	—
	1973	1,050	800,000	—	—	2,600,000	—
	1974	800	4,000,000	—	—	1,300,000	—
	1975	1,050	1,850,000	350,000	—	—	—
	1976	2,500	5,000,000	-	—	—	1,000,000
Region Total		7,700	16,650,000	850,000	250,000	7,400,000	1,000,000
V	1972	—	—	—	—	1,000,000	—
	1974	400	450,000	—	—	1,250,000	2,000,000
	1975	800	1,500,000	170,000	—	1,000,000	—
Region Total		1,200	1,950,000	170,000	—	3,250,000	2,000,000
VI	1972	1,100	4,400,000	—	600,000	1,500,000	1,000,000
	1974	—	—	—	225,000	—	—
Region Total		1,100	4,400,000	—	825,000	1,500,000	1,000,000
VII	No acquisition or Development proposed 1972-76.						
GRAND TOTAL		16,710	$29,600,000	$4,030,000	$1,135,000	$15,000,000	$6,450,000

Source: Department of Natural Resources, Division of Forests and Parks.

Division of Fisheries and Game

The Division of Fisheries and Game in the Department of Natural Resources provides and enhances hunting and fishing opportunity through management of fish and wildlife resources. Other outdoor recreation uses are provided when consistent with sound fish and wildlife management. The Division's projected total acquisition and development program for 1972-76 is shown in Table VIII-6 by region.

Water Resources Commission

The Water Resources Commission in the Department of Natural Resources is responsible for coordination of water and land resources related activities, with special concern in water conservation, flood prevention and water policy formulation. Where appropriate the Division develops recreational facilities on its lands.

The five-year land acquisition of the Division is shown in Table VIII-7 by year and by region. Development proposed for these lands is shown in the projected program under the Federal Soil Conservation Service small watershed program. In summary the program would acquire 4,755 acres of land and 1851 acres of water at an estimated cost of about $3,500,000.

A major investigation currently in process involves a proposed reservoir site in Ipswich which, if favorably considered, will be acquired under Chapter 767 of the Acts of 1970, an act authorizing the Water Resources Commission to acquire water impoundment sites to meet the future water resource needs of the Commonwealth. The total estimated acquisition and construction cost of the project would be about $27,000,000.

The Public Access Board

The Public Access Board in the Department of Natural Resources is responsible for designating points of recreational access to the waters in the Commonwealth and for the construction of approach roads, parking areas and launching ramps. The Board is considering expanding its program to

Table VIII-6.
Schedule of Acquisition and Development - Department of Natural Resources, Division of Fisheries and Game, Five-year total 1972-76.

Planning Region	Fee Acquisition				Easements		Development		
	Wetlands & Uplands		Streambank		Streambank		Ponded Water		Wildlife Management*
	Acres	Cost	Miles	Cost	Miles	Cost	Acres	Cost	Cost
I	3,500	700,000	2.50	15,000	2.50	3,750	—	—	—
II	4,000	800,000	1.25	7,500	5.00	7,500	10	10,000	275,000
III	3,250	650,000	1.25	7,500	2.50	3,750	—	—	275,000
IV	5,125	1,225,000	2.50	15,000	5.00	7,500	20	20,000	4,275,000
V	4,775	985,000	1.25	7,500	5.00	7,500	20	20,000	275,000
VI	1,350	340,000	1.25	7,500	—	—	—	—	—
Five-year Total	22,000	$4,700,000	10.00	$60,000	20.00	$30,000	50	$50,000	$5,100,000

Source: Department of Natural Resources, Division of Fisheries and Game
*includes miscellaneous renovation and new development.

include access to land areas where recreational vehicles can be used. The proposed five-year acquisition and development schedule is shown by year and region in Table VIII-8. Four types of access are included.

Major Site:	coastal and large lakes; more than 50-car capacity
Standard Site:	10-50 car capacity
Light Use Facility:	small Great Ponds, rivers or streams; 5-20 car capacity.
Fisherman's Landing:	ponds less than 50 acres and small rivers.

Metropolitan District Commission

The Metropolitan District Commission is responsible for managing park and recreational areas, a system of roadways and parkways in the greater Boston metropolitan area as well as an extensive water supply system of reservoirs, watersheds and aqueducts which stretches to Quabbin Reservoir in central Massachusetts. In its five-year acquisition and development schedule, the MDC Parks Division has proposed an estimated total of $40,000,000 at the rate of $8,000,000 per year. Out of these monies, $15,000,000 would be allocated for additional rinks, pools and golf courses; $10,000,000 for acquisition, restoration and re-landscaping of the Charles and Neponset Rivers; $5,000,000 for restoration and development of the Mystic River and $2,000,000 for historic renovation of the islands owned by MDC. Further expansion and peripheral acquisition and development of the existing reservations will cost approximately $7,500,000. These projects all fall in Region IV.

Table VIII-7.
Schedule of Acquisition - Department of
Natural Resources, Division of Water Resources, 1972-76.

Planning Region	Year	Acres		Cost (in dollars)
		Land	Water	
I	1972	172	47	$ 48,000
	1973	214	80	114,400
	1974	374	84	495,200
	1975	1,283	325	40,200
Region Total		2,043	536	$ 697,800
II	1972	303	173	1,095,640
	1973	128	40	95,000
	1974	108	—	45,400
Region Total		539	213	1,236,040
I & II	1972	383	212	55,200
III	1973	138	51	55,000
	1974	523	11	150,500
Region Total		661	62	205,500
IV	1972	1,129	828	1,332,000
Grand Total		4,755	1,851	3,526,640

Source: Department of Natural Resources, Division of Water Resources.

Table VIII-8.
Schedule of Acquisition and Development - Public Access Board, Five-year total 1972-76.*

Planning Region	Major Sites		Standard Sites		Light Use Facility		Fisherman's Landing Development Cost
	Acquisition Acres	A&D** Cost	Acquisition Acres	A&D** Cost	Acquisition Acres	A&D** Cost	
I	—	—	—	—	2.5	250,000	75,000
II	—	—	—	—	5.0	200,000	75,000
III	—	—	5.0	450,000	—	—	75,000
IV	—	—	—	—	12.5	350,000	75,000
V	5.0	900,000	2.5	400,000	—	—	75,000
VI	5.0	1,000,000	—	—	—	—	75,000
VII	—	—	—	—	2.5	300,000	—
Total	10.0	$1,900,000	7.5	$850,000	22.5	$1,100,000	$450,000

Source: Department of Natural Resources - Public Access Board.

* 1) It is projected that 1/5 of any program item will be accomplished annually
2) In addition $50,000 annually is projected on a statewide basis for acquisition of land access

** Includes both the cost of acquisition and development.

Table VIII-9.
Estimated Municipal Expenditures for Acquisition and Development, 1971-76.

Planning Region	1971 Acquisition	1971 Development	1972 Total*	1973 Total*	1974 Total*	1975 Total*	1976 Total*	Total 1972-76
I	$ 100,000	$ 30,000	$ 150,000	$ 150,000	$ 160,000	$ 170,000	$ 170,000	$ 930,000
II	93,000	70,000	825,000	1,000,000	1,100,000	1,200,000	1,200,000	5,488,000
III	N.A.	N.A.	75,000	200,000	300,000	400,000	400,000	1,375,000
IV	2,800,000	4,500,000	6,000,000	6,400,000	6,800,000	7,200,000	7,600,000	41,300,000
V	—	320,000	300,000	400,000	400,000	450,000	450,000	2,320,000
VI	N.A.	N.A.	150,000	200,000	200,000	250,000	300,000	1,100,000
VII	N.A.	N.A.	—	50,000	50,000	50,000	50,000	200,000
Total	2,993,000	4,920,000	7,500,000	8,400,000	9,010,000	9,720,000	10,170,000	52,713,000

N.A. - Not Available

* Total acquisition and development combined (estimated 2/3 for development; 1/3 for acquisition)

MUNICIPAL

The 351 municipalities in the Commonwealth are in varying stages of planning to meet outdoor recreation and open space needs for their communities. To date, there has not been a unified survey of present and proposed municipal acquisition and development programs available. This deficiency will be rectified in the continuing planning program. The municipal sector is estimated to spend a minimum of $52,713,000 in the next five years, based on information available concerning past expenditures. It should be recognized that the figures are not complete and understate the municipal program. Estimated expenditures are shown by region in Table VIII-9. If current patterns continue, about two-thirds of the funds will be used for development and one-third for acquisition.

PRIVATE

The private sector plays a large role in providing outdoor recreation opportunity in the Commonwealth. Currently the only acquisition and development schedules available from the private sector are those of the hydroelectric companies.

The Federal Power Commission licenses hydroelectric project proposals and requires each licensee to prepare an "Exhibit R," which is a plan for recreational use of lands and waters at the project. In Massachusetts there are six hydroelectric projects totalling over 3,100 acres with approximately $2,240,000 designated for recreational development. Of this designated amount $237,865 have been spent as of late 1971. The developments, which include hunting, fishing and boating represent a significant recreational potential. However, of the four projects which have approved Exhibit R's, three have revisions pending. All the projects are located in Region II.

Funding Programs

Sources of funding for acquisition and development of outdoor recreation and open space in Massachusetts are varied and include regular state and local appropriations, state bond issues and state and federal cost-sharing programs. Major funding sources for which information is available are discussed below.

LAND AND WATER CONSERVATION FUND

This fund is one of the more significant funding programs used to provide outdoor recreation areas and facilities in the Commonwealth. In the seven and one-half years of the program, Massachusetts received approximately $20,000,000. Annual apportionments have ranged from a low of $233,710 in fiscal year 1965 to a high of $6,615,342 in fiscal year 1971. The apportionment for 1972 dropped to $6,338,025 due to an allocation formula change.

Several state agencies and many cities and towns have participated in the Land and Water Conservation Fund Program. Communities have consistently played a prominent role in the program through local conservation commissions. Recently town recreation departments have demonstrated an increased interest.

Through December, 1971 monies paid to the Commonwealth under the fund have been distributed as follows: Department of Natural Resources, 30%; Municipalities, 39%; Metropolitan District Commission, 11% and Department of Public Works, 20%.

Land acquired under this program exceeds 10,000 acres and has included six new state forests and parks comprising 2540 acres; an additional 1817 acres within two other parks; two wildlife management areas; one unique natural area and 4600 feet of ocean front beaches. Development has been diverse and includes campsites, swimming pools, picnic areas, day-use recreation areas and municipal playfields.

The expenditure of money for acquisition or development by region is shown in figure VIII-1. About 63% of the fund has been spent in the Eastern Massachusetts Region, which has received 18% of the monies to date. On a statewide basis about 40% of the Land and Water Conservation Fund monies have been spent for land acquisitions with the remainder for development.

The current Fund level of $6,300,000 over the next five years is expected to remain about the same.

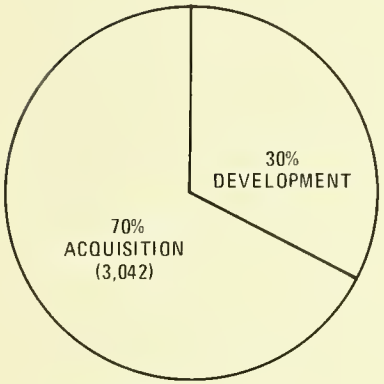
NATIONAL HISTORIC PRESERVATION ACT

A major program under the National Park Service - the National Historic Preservation Act - is administered in Massachusetts by the Secretary of State. The Commonwealth makes use of two types of grants. Survey and planning grants are appropriated directly to the state; Massachusetts will be preparing a State Historic Plan with these funds. Acquisition and development funds are filtered through the Massachusetts Historical Commission directly to localities for individual properties. In 1970 three local projects were funded and seven more are in process with 1971 funds.

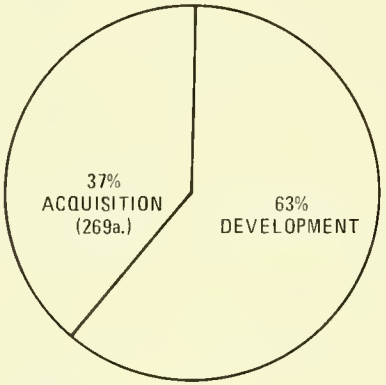
FISH AND WILDLIFE PROGRAMS

The Bureau of Sport Fisheries and Wildlife administers several programs which provide funds for fish and wildlife programs. The Department of Natural Resources, Division of Fisheries and Game, has received federal funds under the Dingell-Johnson Act, a program that provides financial assistance for cooperative projects in research, development, land acquisition, habitat maintenance and wildlife restoration. Massachusetts has received $266,000 in funds from these programs in fiscal

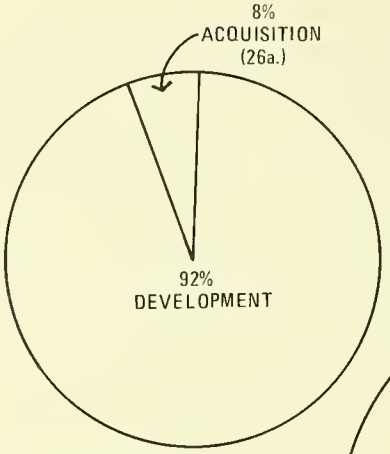
DISTRIBUTION OF LAND AND WATER CONSERVATION FUNDS BY PLANNING REGION AND BETWEEN ACQUISITION AND DEVELOPMENT FOR PROJECTS COMPLETED OR APPROVED THROUGH 12-31-71



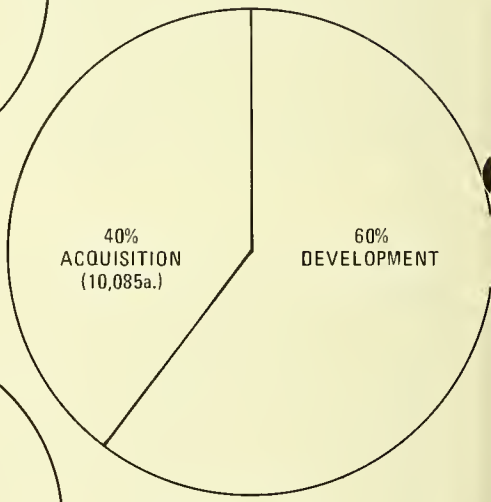
REGION 1
$427,432.43



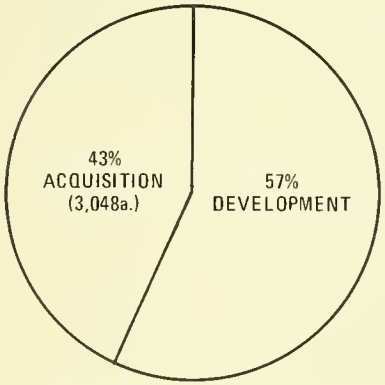
REGION 2
$980,708.09



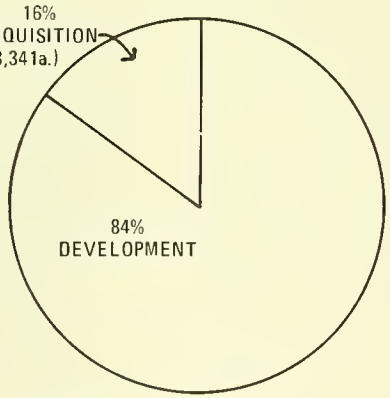
REGION 3
$503,248.96



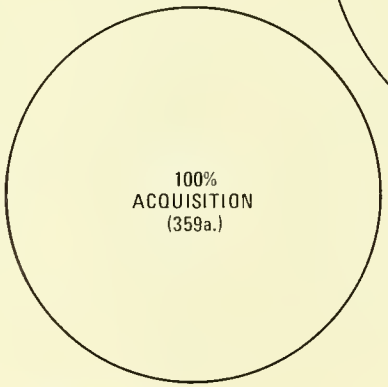
STATEWIDE TOTAL



REGION 4
$5,963,272.39



REGION 5
$1,729,800.00



REGION 6
$431,250.00

Note: Region 7 has not participated.

1971 and as funds become available, the Commonwealth will continue to use these programs. These funds can provide up to 75% reimbursement for research, acquisition and development.

In conjunction with the Division of Fisheries and Game the Department of Natural Resources' Division of Marine Fisheries received funds from the Bureau under the Anadramous Fisheries Restoration Act. In 1971 these funds totaled about $95,000.

RECREATION SUPPORT PROGRAM

The Federal Department of Labor administers the Recreation Support Program. The national total for the program is $15,000,000. Fiscal year 1972 funds for Massachusetts are as follows:

Region	City	Amount($)
II	Springfield	34,368
III	Worcester	40,026
IV	Boston	129,996
IV	Cambridge	37,770
IV	Lynn	11,342
IV	Somerville	25,000

Since the program funds are dependent on yearly legislative appropriation, future projections of funds available cannot be made.

HUD GRANTS

The Federal Department of Housing and Urban Development, administers Open Space Land Grants, Urban Beautification Grants and Historic Preservation Grants which makes cost sharing grants available to state and local units of government. On a statewide basis about $4,000,000 will be available in Fiscal Year 1972 and 1973.

HIGHWAY BEAUTIFICATION PROGRAM

The Bureau of Public Roads under the Department of Transportation administers the Highway Beautification Program. In Massachusetts, the Department of Public Works (DPW) is currently proposing various projects to utilize funds from this program. In fiscal year 1972, the DPW received $45,000 to screen junkyards and hopes to get an additional $20,000 annually for billboard removal. It is estimated that the removal of all billboards in Massachusetts would cost between $12 and 15 million. Therefore, DPW is proposing a pilot project in the Berkshires and on Cape Cod where a segment of the area would be surveyed for illegally placed billboards and then DPW would acquire and demolish these signs.

A project currently under consideration is the "Greenbelt Concept", whereby strips of land would be acquired along the highways to be used for recreational purposes such as bicycle or bridle paths. Another program planned for 1972 initiated but not yet implemented is a $400,000 project to acquire scenic overlooks on the Mohawk Trail and on the west bank of the Connecticut River.

STATE SELF-HELP PROGRAM

The Self-Help Program administered by the Department of Natural Resources, Division of Conservation Services provides technical and financial assistance to communities in the Commonwealth. The Self-Help Program serves to assist town conservation commissions in acquiring natural open-space lands to be used for passive types of recreation through 50% reimbursement of total acquisition cost. However, if the town received federal matching funds from HUD or BOR Programs, the state provides only 25% reimbursement. For a town to become eligible to receive funds from this program it is required to prepare an acceptable open-space recreation plan and acquisition program that includes analysis of present and future open space needs of the community. The entire cost of the project must be appropriated by the town before DNR will give final approval for reimbursement.

Since the inception of the Self-Help Program, 117 communities have received 50% reimburse-

Table VIII-10.
Municipal Purchases with Self-Help Funds
1966-71 and Proposed Projects.

Planning Region	Purchases 1966-71		Proposed Acquisitions	
	Acres	Cost	Acres	Cost
I	827	$ 532,250	24	$ 27,000
II	1,023	232,315	198	90,975
III	2,106	686,034	237	100,770
IV	5,177	7,034,842	3,170	4,678,329
V	608	228,386	68	29,000
VI	1,777	893,824	436	950,969
VII	—	—	4	23,500
Total	11,518	$9,607,651	4,137	$5,900,543

Source: Department of Natural Resources, Division of Conservation Services

ment from the Commonwealth for the purchase of over 11,500 acres of open space. The state reimbursement share has been slightly over $3,200,000. These purchases have included woodland, meadows, inland and coastal wetlands, streams, ponds, lakes, dams and both fresh and salt water beaches. Among others, the recreational activities on these lands include hunting, fishing, swimming, picnicking, camping, boating, skiing and skating. Past and proposed acquisitions with the Self-Help Funds are shown by Region by Table VIII-10.

The demand for Self-Help funds is expected to drastically increase in the immediate future reflecting growing concern by municipalities to preserve open-space lands. Total requests for funds are anticipated to exceed the present $740,000 allotment by another $1,000,000 creating a serious budgetary problem for the program. In the future, it is expected that priority for Self-Help funds may be given to wetland acquisition and protection due to the wide range of local, regional and state efforts to protect wetlands.

STATE A-1 RECREATIONAL ACRES FUND

This fund is a device used to support general recreation purposes (maintenance, operation and expansion) at state-operated facilities located outside of the area serviced by the Metropolitan District Commission. Monies for this fund come from user fees; however, when the total annual receipts do not completely cover operating cost, each town and city is charged a fee to cover the funding cost. Capital outlay items between 1966 and 1971 totalling $69,500,000 breakdown as follows:

1. For the construction and development, redevelopment and improvement of swimming pools, swimming areas, skating rinks and associated facilities:
   1. Chapter 632, Acts of 1966 $5 million.
   2. Chapter 906, Acts of 1969 $10 million.
   3. Chapter 726, Acts of 1970 $10 million.
   4. Chapter 954, Acts of 1971 $5 million.
2. For the costs of planning and the development, redevelopment and improvement of outdoor recreation areas:
   1. Chapter 648, Acts of 1966 $5 million.
   2. Chapter 607, Acts of 1968 $15 million.
   3. Chapter 743, Acts of 1970 $7 million.
   4. *Chapter 742, Acts of 1970 3.5 million.

   (*partially funded by both Recreational Areas Fund and Metropolitan Parks Fund)
3. Federal Capital Improvement Funds established to be used in conjunction with State Capital Improvement Funds when Federal reimbursement is obtainable in certain recreation projects. This fund was necessary because of the reimbursement nature of the B.O.R. Program.
   1. Chapter 85, Acts of 1966 $5 million.
   2. Chapter 743, Acts of 1970 $4 million.

METROPOLITAN PARKS DISTRICT FUND

This fund is similar to the A-1 fund but involves the cities and towns which are located in the greater Boston metropolitan area.

1.	Acts of 1966	5. million.
2.	Acts of 1967	2.3 million.
3.	Acts of 1968	3. million.
4.	Acts of 1970	3. million.
5.	Acts of 1970	10. million.
	Total	23.3 million

INLAND FISH AND GAME FUND

This is a self-sustaining fund that primarily receives its income from Fish and Game license sales and unrebated gasoline taxes. The monies from this fund totalling $8,000,000 are used for acquisition and development of lands, waters, and wetlands for outdoor recreation uses consistent with sound fish and wildlife management practices.

1. Chapter 651, Acts of 1966 $2 million.
2. Chapter 639, Acts of 1968 $1 million.
3. *Chapter 839, Acts of 1971 $5 million.

(*not fully funded from Inland Fish and Game Fund)

GENERAL FUND OF THE COMMONWEALTH OF MASSACHUSETTS

This fund provides financial aid to cities and towns for the construction of water pollution control facilities. These funds also can be used for research and demonstration projects directed toward improved methods of pollution control.

1. Chapter 687, Acts of 1966 $150 million (for 10 year period not to exceed 15 million per year)
2. Chapter 747, Acts of 1970 $250 million

MISCELLANEOUS STATE FUNDS

These funds include:

1. Recreational Vehicles Fund $600,000 per year.
2. Harbors and Inland Water Fund $600,000 per year.
3. Public Access Fund $500,000 per year.

The above funds derive their income primarily from that portion of the State Gasoline tax that is not committed to the improvement and the expansion of the state's highway system. These funds are also supplemented by other incomes such as license fees for recreational vehicles.

Other Programs

Several programs not falling in the categories of acquisition and development or funding have an important impact on outdoor recreation in the Commonwealth and are discussed below.

FEDERAL SURPLUS PROPERTY DISPOSAL

The Federal General Services Administration has a program of federal property disposal in which federal lands can be declared excess and turned over to municipalities or states for recreational uses. Some rather large acreages in Massachusetts held by the Department of Army have considerable recreational value and appear to be only partially used for defense purposes. There is a high probability that some of these areas could be declared excess and turned over to the Commonwealth to meet pressing recreation needs, especially in the urban areas of the Eastern Massachusetts and Connecticut Valley Regions.

The Commonwealth has already gained substantially from this program and is interested in further ownership at the Cohasset Annex which comprises 750 acres and is adjacent to Wompatuck State Park. It would also be interested in part or all of the Natick Labs Annex (2,873 acres) which also contains a Great Pond, Otis Air Force Base (1,253 acres) and Fort Devens (10,098 acres). Such lands could make a significant contribution to meeting the outdoor recreation needs of the Commonwealth.

INLAND AND COASTAL WETLANDS PROGRAMS

Massachusetts is one of the nation's leaders in Inland and Coastal Wetlands legislation as exemplified by the Inland and Coastal Wetland Protective Acts, the Hatch Act and Jones Act.

According to Senate Study No. 127, "Report of the Department of Natural Resources relative to the Inland Wetlands and Flood Plains of the Commonwealth", June 5, 1967, it was estimated that the total acreage of inland wetlands in the Commonwealth was 309,413 acres. As of December 31, 1971 public hearings to propose restrictions on 3,019 acres under the Inland Wetlands Protective Act (Ch. 131, Sec. 40A) have been held in four towns: Wellesley, Dover, Sherborn and Dedham. Future progress in securing restrictions on additional wetlands will depend on several factors: changes in the statute to tighten process of objection and due process procedure; additional personnel and/or assistance from regional or local agencies; contract for additional statewide delineation and mapping; and policy for handling areas where objections to restriction have been received. At this time it is impossible to speculate on the proportion of wetlands which will be restricted in the Commonwealth over the next five-year period.

The Program under the Coastal Wetlands Protective Act has been in existence for six years and has been steadily accelerating over that period. If public hearings were held at anticipated rate of ten communities per year, it should be possible to complete the program by 1973. Present and future activities in restricting coastal wetlands are listed below:

Areas Restricted: (15 communities)

Saltmarsh	21,835 acres
Barrier Beach	160 acres
Tidal Flats	3,025 acres

Restrictions Pending: (11 communities)

Saltmarsh	11,030 acres
Contiguous Fresh Marsh	1,130 acres
Barrier Beach	3,080 acres
Tidal Flats	3,265 acres

Future Activities

Saltmarsh	10,496 acres
Contiguous Fresh Marsh	1,410 acres
Barrier Beach	228 acres
Tidal Flats	not available

Two major pieces of wetland legislation are the Hatch Act of 1965 and the Jones Act of 1963. The Hatch Act prohibits the removal, filling or dredging of land bordering on inland waters without first filing a written notice and a plan of proposed activity to both the mayor or selectmen of the town concerned and to the state Departments of Natural Resources and Public Works for their review. In 1971 a total of 354 applications were received from private and municipal filings - a 15% increase from the previous year.

The Jones Act similarly prohibits the removal, filling and dredging of areas bordering on coastal waters without first filing with both the town authority and the state Departments of Public Works and the Director of the Division of Marine Fisheries. During 1971, 113 applications were received which is roughly equivalent to applications filed in previous years. The town is then required to hold public hearings on the proposed project after which time the Selectmen make recommendations to the two state agencies. If the project violates the interests of either agency, certain conditions will be imposed before the project may proceed.

CONSERVATION COMMISSIONS

Although not a program in the literal sense, the conservation commissions of the Commonwealth present a unique opportunity to further outdoor recreation and open-space programs.

The conservation commission movement was begun in 1957 in Massachusetts with passage of Chapter 40, Section 8C of the General Laws. The commissions represent a citizens' response on the local level to the problems of landscape change and environmental deterioration. The need for public action for conservation on the local level has been felt for many years. The idea was accepted by 12 towns in 1958 and up to 150 by 1960. As

of 1971, 296 (84%) of the 351 municipalities in the Commonwealth had conservation commissions. The communities which have joined the movement include all the state's major urban areas.

The Massachusetts Conservation Commission is an official town committee created by the acceptance of the enabling act. It is the focus of most town action relating to the protection of natural resources. It has three to seven members who are appointed by the selectmen or the mayor. A major source of funding for conservation commissions has been the state Self-Help program which has been largely responsible for the rapid growth in the number of conservation commissions. Other funding programs used by town conservation commissions for open space land planning, acquisition and development include the HUD Open Space Program of the 1961 Housing Act and the 1965 BOR Land and Water Conservation Fund. Further description of the conservation commission movement in the Commonwealth is contained in Appendix D.

POLLUTION CONTROL

The Division of Water Pollution Control in the Department of Natural Resources is primarily responsible for enhancing the quality of inland and coastal resources in the Commonwealth through programs for prevention, control and abatement of water pollution. The Division administers two bond issues totalling $400,000,000 which provide state assistance in the construction of municipal and regional sewage treatment facilities. Land is acquired by these local units through purchase or eminent domain proceedings. Careful planning for the future of water-based recreational opportunities is necessary to insure that planned uses are consistent with assigned water quality classifications. The Division believes that within the next five years the waters of the Commonwealth should generally meet assigned water quality standards, particularly in terms of dissolved oxygen levels and bacteria levels. Problems associated with urban and agricultural runoff will continue to be significant. In its five-year projections for municipal treatment needs, the Division estimates a total cost of $768,600,000 of which the state would contribute approximately $191,900,000.

THE NEW ENGLAND RIVER BASINS COMMISSION

The commission, authorized under Title II of the 1965 Federal Water Resources Planning Act, received $43,000 from each state, matched by the Federal government, to serve as principal agent for coordinating all plans for the development of water and related land resources in New England. Current projects under the direction of the U.S. Army Corps of Engineers include the North Atlantic Regional Water Resources Study; the Northeastern U.S. Water Supply Study; the Connecticut River Comprehensive Study and the Southeastern New England Study, (SENE) which are all primarily funded by federal monies. The SENE Study is planned for four years at an estimated cost of about $3,500,000.

"701" PLANNING FUNDS

The Department of Housing and Urban Development (HUD) provides a major source of funds for planning in Massachusetts through the Comprehensive Planning Assistance Program (authorized by Section 701 of the Housing Act of 1954, as amended), which provides state, regional and local assistance for comprehensive land use planning. The two agencies in the Commonwealth funded under the "701" program are the Office of State Planning and Management (OSPM) which acts as the state clearinghouse for federally funded projects, and the Department of Community Affairs (DCA). The DCA has administered funds from this program to 214 of the State's 351 municipalities and the 12 Regional Planning agencies in the Commonwealth. Under this program, about $2,750,000 will be available to Massachusetts in Fiscal Years 1972 and 1973.

RECOMMENDATIONS

Because of the myriad number of outdoor recreational needs to satisfy in Massachusetts, open-space programs must be formulated within a framework of policies and priorities. Based on these policies and priorities, recommendations for future action are presented by level of government and the private sector in recognition of their differing roles and responsibilities. Separate sections discuss special opportunities to meet recreation needs, public involvement in recreation planning and the continuing planning program.

General Policies

It should be the policy of all levels of government in the Commonwealth to:

1. assure that recreation and open space are given their proper places as prime land uses.
2. provide equitably for the open-space and outdoor recreation needs of all citizens of the Commonwealth.
3. provide programs to insure the delivery of outdoor recreation opportunities for the handicapped, the elderly, the disadvantaged, and residents of extremely dense urban areas.
4. identify and protect unique natural and cultural features.
5. insure public access to all resources in the Commonwealth such as the ocean, rivers and streams, lakes and ponds, mountains, and forests which provide public outdoor recreation opportunities.
6. promote effective communication and coordination among all levels of government in order to better meet the total recreation needs of the citizens.
7. establish an adequate informational program to publicize available outdoor recreation resources within the Commonwealth.
8. establish or promote conservation programs and environmental education.
9. work in a coordinated manner to meet the total recreation needs of citizens, including the involvement of citizens and citizen groups in the planning, development and administration of park and open-space programs.
10. conduct research into areas of special needs for recreation and develop standards, criteria, and programs to meet those needs, and to require that master plans (including management plans) be prepared for all outdoor recreation areas.

Priorities

The role of planning should be considered the major priority in all outdoor recreation programs in Massachusetts. This includes state, regional and local comprehensive outdoor recreation and open-space planning and master planning for individual recreation areas, facilities and projects. However, it is not meant to imply that current acquisition and development should be halted until all such plans are completed. Acquisition and development should be continued in accord with previously prepared regional and local agency plans and in accord with priorities and recommendations set forth in this plan. It is meant to imply that all levels of government with programs in Massachusetts should give emphasis to planning in order to 1) provide adequate recreation opportunities for its populace, 2) maximize benefits from expenditure of public funds and 3) protect and conserve the natural resources of the Commonwealth.

PLANNING

It is recommended that funds be expended for planning in the following areas:

Statewide Recreation Planning involving the continual updating and revision of this 1971 SCORP. Efforts should be made to accomplish the following:

a) coordinate activities with municipal and regional planning agencies, private groups such as the Trustees of the Reservations and Massachusetts Audubon, federal agencies, other state agencies, and other states;

b) initiate and conduct recreation research projects, studies, and inventories and coordinate with organizations which are concerned with the field such as the federal and state governments, educational institutions and individuals. This would include the design of a monitoring system and uniform analysis method to measure recreation demands and needs in Massachusetts and coordination of this system with that of other New England states.

c) properly design and coordinate inventory and research information in order to adapt the data to a portion of a comprehensive state land-use plan.

Regional and Local Comprehensive Planning involving a land-use plan and recreation and open-space plan as an integral part of a comprehensive master plan for the development of the community or region. The recreation needs of the area and implementation program to meet these needs should be developed in such a recreation and open-space plan.

Recreation Project Planning involving all state and local recreation areas. This would be the development of a master plan that would include a complete natural and cultural inventory, land-use capability plan and a development and management plan. In addition, state project planning should a) conduct research into new techniques and materials for recreation area design construction and management; b) provide technical aid to communities and regional planning agencies which request help in planning and design of recreation areas and parks; and c) develop public educational and informational materials on environmental functions and recrea-

tional facilities offered in Massachusetts (these materials would be used in visitor centers and in publications).

ACQUISITION AND DEVELOPMENT

Because of the continued destruction or loss of open spaces to other land uses, as well as the spiraling land costs, particularly in urban areas, top priority on a statewide basis should be given to land acquisition. At the same time, high priority must also be given to development. It is therefore suggested that the Commonwealth undertake a balanced program of acquisition and development. In areas of the state where ample, suitable and properly located recreation and open-space resources are available and meet generally accepted national standards, then top priority should be given to development.

The following charts outline priorities for acquisition and development on a statewide basis. Acquisition and development in Level A have priority over Level B. Also, in each level acquisition has a higher priority than development. Within each acquisition and development category, project types are not ranked in order of importance.

In the consideration of project priorities, top priority should be given to projects which are 1) in accord with existing state, regional and local outdoor recreation and open-space plans, and 2) are located in recreation or open-space areas for which a master plan has been prepared.

There are occasions when highly desirable parcels become available unexpectedly and should be acquired despite other project priorities. Such opportunities might include acquisition of government surplus property, tax delinquent lands or large parcels of land in which the owners are amenable to public control. These occasions are infrequent and represent unanticipated acquisition opportunities that should not be lost.

The following section identifies the types of acquisition and development priorities proposed for each of the priority categories.

LEVEL A PRIORITIES

Acquisition

recreation lands to serve residents in the urban high-density population areas

protection of water resources and provision of access to land and water resources

continuing implementation of existing programs

unique natural and cultural elements of national and state significance

Development

recreation facilities to serve residents in urban, high-density population areas

renovation or rehabilitation of threatened resources

high intensity nonurban development in areas of heavy recreational demand

LEVEL B PRIORITIES

Acquisition

reservation of wild areas

unique natural and cultural elements of regional and local significance

Development

visitor information centers and interpretive facilities

less intensive use development

A PRIORITY-ACQUISITION

Recreation Lands to Serve Residents in Urban, High Density Population Groups

New acquisitions or additions to existing lands clearly serving residents of urban portions of the state and assistance to municipalities and organizations for acquisition of areas which hold high potential for satisfying recreation needs of high density population areas should be made.

Protection of Water Resources and Access to Land and Water Resources

Inland and coastal wetlands, rivers and streams, lakes and ponds, coastline and beaches should be acquired and protected by restriction. New acquisitions and easements to preserve and properly manage Massachusetts water resources and to provide flood protection and protect fresh-water and marine resources are included. Public access to land and water resources for passive as well as active recreational uses should also be provided.

Continuing Implementation of Existing Programs

This priority includes land acquisition in accordance with goals and objectives for existing state forests and parks, fish and wildlife areas, local parks, recreation and conservation areas, and the continuation of programs to provide public access to undeveloped areas, beaches, ponds and other water bodies. Efforts should be made to acquire inholdings and intrusions to protect views and support existing A level acquisition and development programs.

Unique Natural and Cultural Elements of National and State Significance

Historical areas and structures and landscape features unique and important in the development of land and culture in Massachusetts should be acquired and protected. These areas could be of statewide or local significance and could include geological, archaelogical or landscape features, historical sites, specimen plants, mill sites, habitats of endangered plants or animals, and areas integral to existing sites.

A PRIORITY-DEVELOPMENT

Recreation Facilities to Serve Residents in the Urban, High-Density Population Groups

This includes renovation and improvement of existing facilities as well as new developments in the urban areas which provide a variety of outdoor recreational experiences for the greatest number of users, with emphasis on neighborhood facilities, especially those containing water-oriented features.

Renovation or Rehabilitation of Threatened Resources

This includes rehabilitation and renovation of important existing outdoor recreational facilities which could, with improvements, remain in service. This program is also designed to renew resources damaged by overuse, including soil compaction and subsequent damage to vegetation in campgrounds and picnic areas. This priority also calls for the restoration of structures unique to New England, such as historical buildings, old bridges, dams, and stonewalls.

High Intensity Nonurban Development in Areas of Heavy Recreational Demand

This includes development programs in areas of heaviest recreational demand outside urban concentrations, provision of public access to heavily used resources in nonurban areas, development of new water sources for recreation, development in areas promoting tourism or where recreation can be considered a major economic contribution, and provision of public access sites to existing water bodies where access is not now available.

B PRIORITY-ACQUISITION

Reservation of Wild Areas

Although it is extremely difficult to identify a wilderness area in the Commonwealth, with exception of the Quabbin Reservoir many relatively undisturbed wild areas are intact. These areas include lands which may have been influenced by man in the past but have been reclaimed by nature. In an urban state such as Massachusetts they should be protected as unique areas. Several areas in the Berkshires (especially high mountain and ridge tops), and some larger swamp areas in the state are examples of relatively undisturbed lands.

Unique Natural or Cultural Elements of Regional or Local Significance

Same as the national and state areas included under Level A.

B PRIORITY-DEVELOPMENT

Visitor Information Centers and Interpretive Facilities

This includes the establishment of visitor areas at the most heavily used parks, visitor centers in parks with unusual areas or features, and nature centers in units that contain unique natural or cultural features. These facilities would include equipment and displays which would orient the visitor to the area's features and provide such aids as sign systems and self-guided nature trails. This program should also be tied in at local levels to relate to school or community programs teaching conservation values and the importance of open-space lands.

Less-intensive Use Development

This includes development in the less heavily used areas such as natural or wild areas, access to primitive areas, less intensive use in urban areas, or developments which do not affect a large portion of public recreation demand, such as equestrian complexes, recreation vehicle trails, and marinas.

Recommendations

FEDERAL GOVERNMENT

The federal government should continue to provide programs of technical and financial assistance and to manage and protect outstanding natural, cultural and historic resources of national significance. It is recommended that:

1. The Corps of Engineers continue to undertake projects providing outdoor recreation facilities in accordance with P. L. 89-72.

2. The Corps of Engineers continue to lease lands which can be used to expand camping facilities along the Cape Cod Canal.

3. The Federal Power Commission continue to require private utilities to prepare "Exhibit R's" that are responsive to recreation needs and that any revisions considered by a utility in an approved Exhibit R be closely coordinated with this Plan.

4. The Bureau of Sport Fisheries and Wildlife continue its management of wildlife refuge areas to include as many recreational uses as possible. These uses, including interpretive programs, should be consistent with sound wildlife management practices.

5. The National Park Service continue its programs to protect, preserve and interpret the national heritage of the Commonwealth, particularly where the acquisition of nationally significant areas augments the recreation and open-space value of the urban environments.

6. The General Services Administration programs of federal property disposal be vigorously carried out and the federal government continue to investigate the recreation and open space potential of all federal properties.

In addition to past and present federal levels of activity it is recommended that:

1. The Federal Power Commission encourage experimental programs aimed at identifying potential beneficial effects of energy production. Such programs should include feasibility studies on the use of heated waters (now discharged as waste) for warming waters along cold-water ocean beaches, stimulating marine growth for acquacultural purposes and heating public recreation facilities and structures.

2. The National Park Service accelerate its land acquisition program for the Cape Cod National Seashore and Minuteman National Historic Site. Consideration should be made for expanding designated boundaries of these areas to protect them from residential and industrial encroachment.

3. The Land and Water Conservation Fund include as eligible projects recreation buildings and facilities such as indoor pools and rinks, community and environmental education and conference centers. This would greatly increase the possibility of providing year-round participation in such activities where the climatic conditions generally limit their availability.

STATE GOVERNMENT

The State should continue to plan, acquire, develop, operate and maintain lands and facilities for public recreational use and protect and enhance natural resources. It is recommended that:

1. Greater effort be made especially in urban areas to stabilize the areas now clean and to clean-up the natural lakes, ponds and streams which have been polluted in the state. Such efforts could broaden the potential recreation supply and provide increased recreation opportunities.

2. Greater emphasis be placed on providing public access to land and water recreational resources, especially in the urban areas.

3. Emphasis be given to the restriction of wetlands under existing legislation. In coastal urban areas, a significant portion of the wetlands should be acquired for public access and recreational use.

4. Major emphasis be given to acquiring and preserving additional remaining lands along the coast and important river systems.

5. Inholdings and intrusions in existing forests and parks be acquired in order to minimize land-uses inconsistent with park use.

6. Vacated rights-of-way, such as abandoned railroads, canals, or utilities, be acquired for recreational use, including trail systems. When not immediately needed, these rights-of-way could be held in a Land Bank for future recreational use, or for potential transportation corridors.

7. Present plans for visitor centers at State facilities be implemented including provisions for the staffing of experts in environmental education. Plans for creating a State Environmental Education Center should also be implemented.

8. State surplus lands be thoroughly investigated for recreational and open-space potential or environmental importance.

9. Continued attention be given to providing specially designed facilities that enable the handicapped, elderly, or disabled to use and enjoy outdoor recreation areas and facilities.

10. Unique landscape and resource elements be protected by restrictive legislation, purchase of easements or development rights, outright acquisition, or other means. Such landscape and resource elements could include:

- rivers and streams, especially "wild", "scenic" or "recreational" rivers
- islands in rivers, lakes and ponds, and in the ocean
- lakes and ponds
- unique natural areas including geologic, archeologic and botanic areas
- unique cultural areas and historic and architectural sites
- town commons
- unique or important open space threatened by urbanization, or despoilation
- prime agricultural lands
- wilderness areas
- significant mountains, mountain peaks
- ridgetops, significant overlooks and protection of views
- habitats of endangered species, plants or animals.

In addition to its function in protecting these areas the state should serve as a leader in coordinating the efforts of other agencies and private organizations involved in the preservation and management of such areas. This would involve the collection of data, dissemination of information and development of evaluative techniques to identify priority areas.

11. A program be initiated to improve the sign system directing the public to state recreation areas and to standardize the system on a statewide basis; that a public relations program be implemented to inform the public of the location and facilities available at recreation areas.

12. Coordination of comprehensive planning with departmental agencies, other state agencies, regional agencies and the federal government be formally institutionalized.

In addition to the state's past and present role, it is recommended that the following new programs or concepts be established:

1. Town Commons be recognized as lands with unique open space and historical value. Steps, including legislation, should be taken to protect them from potential despoilation and loss and to protect Town Commons in perpetuity from any threat of changing use. State funds should be provided and

administered through the Department of Natural Resources, Division of Conservation Services for restoration and landscaping of Commons as passively-utilized open spaces; for enhancing the streets adjoining Commons through such programs as tree planting; for sign systems and street furniture in character with the Commons.

2. Formulation of a Land Bank which could be used in the acquisition and designation of lands to be held for future recreational and open-space purposes. These lands would initially support minimal recreation such as hiking and fishing (especially in cases of federal and state surplus lands or abandoned rights-of-way).

3. The development of plans to implement a State Scenic corridor system on existing and future roads and trails, with emphasis in urban areas. The planning and design of this program should be a cooperative effort between the Executive Office of Environmental Affairs and the Executive Office of Transportation and Construction.

4. Commitment to innovative techniques of recycling and re-use of existing water supplies in lieu of a program for developing water resources in distant areas of the Commonwealth and for shipment to eastern urban communities. Such a program would be accomplished by redirecting basic policies and funding programs guiding the development of water supply. It would call for additional programs separating combined sewer systems, constructing new reservoirs and cleaning up the natural water systems in Eastern Massachusetts. One result of reservoir construction and rivers cleanup would be to greatly expand opportunities for water-based recreation on existing water bodies.

5. Commitment to the development of a land-use policy and plan for the Commonwealth including a program for continued comprehensive land-use planning and utilization of modern techniques and methods. In order to achieve this goal, the Commonwealth should establish a Land-Use Board, comprised of each of the Secretaries created in the recent re-organization of state government. The Land-Use Board would direct the development of a Land-Use Policy for Massachusetts; preparation and maintenance of the Land-Use Plan would be carried out by the Secretary of Environmental Affairs.

The Land-Use Policy would incorporate and harmonize all use of the lands and other resources of the Commonwealth, control air, water, and soil pollution, regulate commercial activities which disrupt or destroy the natural environment, and direct growth and development along planned lines.

The Land-Use Board would hold complete jurisdiction over all state-owned lands and direct the Secretary of Environmental Affairs to prepare for all State lands, land management plans that include agency maintenance programs. In the development of the State Land-Use Plan, utilization of computers should be encouraged and fully coordinated to insure inter-agency communication. In addition extensive use of modern techniques should be used in land-use planning including aerial photographs and mapping (x and y coordinates) which can then be stored in a data bank.

6. Implementation of goal of providing a more balanced recreation and open-space program. This would involve the adoption of a concept for design and planning of all types of units ranging from intensively used state recreation areas to state wilderness areas.

7. Development of management plans that recognize the imperative need to limit access and use of state lands by recreational vehicles. State lands which can absorb vehicular impact (areas that have more tolerant soils, vegetation, wildlife, etc.) must be identified and designated or zoned as areas where recreation vehicles can be allowed.

8. Encouragement of private development to provide and designate spaces for public recreation use and enjoyment.

9. Commitment to increased financial and technical assistance to regional and local agencies for planning, acquisition, development, programming and management of recreation areas and facilities.

In reviewing the state funding programs it is evident that traditional programs for capital improvements for recreation are inadequate to support expansion of present program levels. The following comments highlight specific problems which need further study:

1. There is a lack of commitment to a specific level of expenditure to meet recreational needs. Without definite knowledge of the future scope of total funding it is nearly impossible to develop and implement a plan to meet the recreational needs of the Commonwealth.

2. The monies available from self-supporting funds (such as the Inland Fish and Game Fund) is inadequate to meet existing levels of expenditures.

3. The concept of Unrebated Gasoline Tax (i.e. Public Access Fund) provide only a limited source of funds and is inadequate to meet program needs.

4. The concept of the Recreational Areas and Metropolitan Parks District Funds are presently operating on a ratio in excess of one to four, representing income from all sources to charge-back to respective cities and towns. It can only be anticipated that this ratio will, in fact, worsen due to the increased level of bond indebtness and operational costs. This concept is under review at present because payments are supported by presently high local property tax rates.

The recently created office of the Secretary of Environmental Affairs (OEA) encompasses nearly all state agencies involved in the Recreational Areas Fund. The OEA is designed to eliminate duplication of effort and lack of co-ordination which has existed in the past. It will also analyze these funding prob-

lems and implement a total, unified state plan for funding of recreation and open-space programs.

MUNICIPAL GOVERNMENT

Communities play a very vital role in providing the outdoor recreation and open-space needs for their citizens. Their jurisdiction lies where people live and hence the recreation needs are most acute at the community, neighborhood and sub-neighborhood level. In addition to the past and present level of activities provided by Communities it is recommended that:

1. Recreation lands, facilities, and programs be provided not only at the community-wide or city-wide level, but at the neighborhood and sub-neighborhood levels.

2. Greater effort be given to maintaining existing public recreation areas and facilities and that all public areas in the city be maintained as a recreational resource by good housekeeping, including cleaning and clearing of ice and snow to allow pleasure walking and sightseeing (except during the winter on streets or hills formally designated for winter sport use such as sledding).

3. Greater effort be made to cleanup the natural water systems of the towns and cities by building more and better waste water treatment plants, separating the storm and sanitary sewage systems, and returning used water back to natural water courses in clean condition.

4. Greater emphasis be given to provide public access to recreational resources such as streams and rivers, and the ocean, lakes and ponds which are significant to the community.

5. Consideration be given to locating community-wide facilities adjacent to public transit lines, and that neighborhood and sub-neighborhood facilities be located within easy walking distance of the residents of the neighborhood.

6. Special programs as well as facilities be provided for meeting the recreational and open-space needs of groups such as the elderly, the handicapped and the disadvantaged.

7. Communities recognize and respond to the diverse ethnic and cultural heritage of the cities, towns and various neighborhoods through design and planning of programs and facilities.

6. Communities recognize the need to maximize the use of public facilities such as school gyms, swimming pools, auditoriums, school yards and playfields by making these facilities available to the whole community during times when the facilities are not used for their primary purpose.

9. Residents of neighborhoods be involved in the planning, construction and maintenance of neighborhood recreation areas and that whenever possible equipment be simple, inexpensive and easy to maintain.

10. Whenever possible, communities reserve unique lands in their natural state for use as living laboratories which can be used for self-guiding nature trails, and other types of environmental educational programs.

11. Community planning and programming for open-space and recreation needs consider the values of locally significant historical sites, unique natural areas, significant hills and views, areas prone to flooding and agricultural lands, and take actions to protect and preserve these resources.

12. Communities explore means other than outright purchase to protect open-space lands. This would include zoning, easements and tax incentives.

13. Communities recognize Town Commons as a valuable community resource with unique open-space and historic value. Steps should be taken to protect them from possible despoilation or loss.

14. Communities develop comprehensive trail systems for walking, bicycling, horseback riding, and trail bikes; these should tie in with similar systems in neighboring communities as well as statewide trail system.

15. Communities strive to improve the general quality of life in the cities and towns of the Commonwealth through implementations of the above recommendations.

PRIVATE

While government assumes major responsibility for providing recreation areas and facilities for general public use, two private sectors play an important part in meeting recreational needs. The private "profit" sector should continue to provide quality recreation at a reasonable cost, and particularly to provide services and specialized activities meeting individual preferences. The facilities provided by the private profit sector are as diverse as campgrounds and resort hotels, boat liveries and bait shops, golf courses and driving ranges, amusement parks and swimming pools.

The private "non-profit" sector is vital in complementing the governmental and private profit roles, particularly in the areas of environmental education, conservation and preservation. It plays a significant and necessary role in providing quality recreation and open spaces at the local and regional level. In the Commonwealth, this group is typified by the Massachusetts Audubon Society and the Trustees of Reservations. Also included in private non-profit recreation are quasi-public organizations such as the Boy Scouts, the YMCA and the American Legion. For the most part the private non-profit organizations involve participants in experiences which teach values of life and appreciation of the environment. This is accomplished through conservation and environmental education, the teaching of recreational skills and positive uses of natural resources.

To obtain optimum participation and results from the two private sectors, the state should make available information and data on supply, demand

and needs that can be utilized by those interested. Coordination of information from the many public, private and institutional sources and the publicizing of needs and concerns is necessary to encourage and guide the private sectors. Along with various specific natural resource studies, the 1971 State Comprehensive Outdoor Recreation Plan is a major effort in accomplishing these ends.

When the private sector cannot adequately or economically supply areas to meet public recreation needs, the public sector must step in to direct, coordinate or perform this function.

Opportunities

There are several "special opportunities" to identify and meet recreational and open-space needs in the Commonwealth. They include current recreational and land-use studies undertaken by government agencies, under-utilized or untapped resources and the forthcoming National Bicentennial Celebration.

CURRENT STUDIES

The following are studies now underway which are related to open space and recreational land-use.

Southeastern New England Study

The Southeastern New England (SENE) Study, sponsored by the New England River Basins Commission and managed by a team of state and federal officials, is designed to integrate water and related resource planning and to develop a comprehensive resource plan for the study area. The study area includes nearly all of Rhode Island and the eastern two-fifths of Massachusetts representing 70% of the population of Massachusetts. The SENE Study was initiated to identify and recommend actions to be taken by all levels of government and by private interests to secure a full spectrum of resource use resulting from a balance between conservation and the development of water and related land resources.

Although the results of the study will not be completed until 1975, many benefits should accrue to the Commonwealth prior to the study's completion. Already the Commonwealth has joined with the Bureau of Outdoor Recreation and the state of Rhode Island as one of the Outdoor Recreation Component Unit's tri-chairman. Through this association the state intends to further improve its intra- and inter-state recreation planning programs.

New England River Basins Commission (NERBC) Power - Environment Program

Under its Power-Environment Program, the New England River Basins Commission is conducting a study on peak power demands and the environment. The objectives of the study are to apply environmental considerations to analysis of projected peak power demands, alternative technologies, alternative sites and related transmission facilities. Fifty-five possible pump storage sites identified by the industry, the Corps of Engineers and the Federal Power Commission will be evaluated. This study is scheduled for completion in late 1972. Effective consideration of environmental factors in bulk power system planning and will continue after completion of this study.

Connecticut River Basin Study

The Connecticut River Basin Study was recently completed by the New England River Basins Commission. A principal recommendation for implementation of the plan is the establishment of a Connecticut River Basin Program (CRBP) which will encompass four basic areas: 1) a study designed to supplement the recently completed Connecticut River Basin Report; 2) field level investigations; 3) a public information program; 4) and a public education program. The CRBP will begin in 1972 and is scheduled to be completed in June 1974. The Commonwealth is prepared to assist in this planning effort and provide the inputs necessary to make the public more aware of its stake in helping to develop coordinated planning.

The Green Belt Program

The state Department of Public Works through its Highway Division has proposed green belts adjacent to newly planned highways traversing undeveloped areas. These additional areas, which extend beyond existing rights-of-way, serve as natural and scenic buffers and enhance the environment by eliminating visual eye-sores and reducing noice and air pollution from the highway. The primary recreation function of the green belt approach is to provide areas which have a potential for development as recreation trails. Greenbelt studies will be carried out to determine those highways which lend themselves to this form of adjacent land development.

Environmental Impact Studies

The state Department of Public Works has established an environmental unit within the Highway Division for the purpose of review and coordination of the required environmental impact statements. This unit's work will involve continuous liaison with the Department of Natural Resources on all matters relating to the review and development of these impact statements. This liaison should provide for interchange of needs prior to final plan development.

Boston Transportation Planning Review

The Boston Transportation Planning Review is being conducted by a special task force under the Governor to determine the transportation needs inside of Route 128, specifically the need for more highway construction in this area. The review involves investigation of all present plans for proposed highways and the determination of a more balanced transportation system. A major aspect of the review will be to insure that plan proposals will not have deleterious effects on the environ-

ment. This study is to be completed by late 1972 or early 1973.

Bureau of Transportation Planning and Development Programs

The Secretary of the Executive Office of Transportation and Construction and the Commissioner of Public Works are currently studying a plan to establish, under DPW's Bureau of Transportation Planning and Development, transportation committees within all regional planning agencies. These committees would act as "sounding boards" on matters relating to regional transportation needs and environmental effects. These committees would be comprised of local and state officials, industry and public interest groups.

Regional Transportation Studies

The Department of Public Works is encouraging the various regional planning agencies to participate in the Continuing Comprehensive Cooperative Planning Process being undertaken to upgrade the several regional transportation planning studies done in the 1960's. The role of the regional agencies will be to provide under contract the necessary socio-economic data required by DPW. This new cooperative effort will be called the 3 C's Process. All future transportation studies will include a statement of environmental impact for proposed transportation facilities.

Coastal Studies

Several studies having environmental land-use implications are now being conducted in the coastal waters of Massachusetts: "The Ongoing Current Survey and the Ongoing Sediment Survey", by the U.S. Geological Survey; "Benthic Ecology Survey" (including the Great Brewsters of the Boston Harbor Islands) by the University of New Hampshire; and the "Beach and Coastal Zone Erosion Survey" (with computer capability) by the University of Massachusetts.

Department of Mental Health Surplus Land Study

As of June 1972, all farming operations of the State Department of Mental Helath are scheduled to be phased out. These several thousand acres include not only prime farm land, but also woodlands, wetlands and open spaces. In order to prevent "land grabs" by commercial and local interests, a Land Use Committee composed of the Departments of Mental Health, Natural Resources, and Agriculture, has been established to study the problem and recommend the best possible uses of this surplus land.

UNDERUTILIZED OR UNTAPPED RESOURCES

Within the Commonwealth certain areas have been identified as having significant but as yet unused potential for outdoor recreation. In some instances areas have been subjected to previous development and subsequent disuse, as for example abandoned rights-of-way and canals; it can also be the result of underdevelopment, as is the case of the Boston Harbor Islands. Each of these areas provides potential recreation opportunities for Massachusetts residents, and their usefulness should be explored in greater detail than the time allotted under the present planning program.

Boston Harbor Islands

As man continues to devour open space for homes and industries, he has increasingly eliminated areas for outdoor and recreational enjoyment. Most cities are already faced with a shortage of land for recreation. Fortunately Boston has a great untapped natural resource for open space and recreation — Boston Harbor and its islands. The Harbor, which covers an area of 47 square miles, offers an exceptional opportunity to satisfy the metropolitan area's needs for water-based recreation. Coupled with this, the 30 islands in the harbor, which total about 1152 acres, provide the land mass necessary for such outdoor recreation as picnicking and hiking.

Only in recent years has the potential for harbor development been recognized. Previously the Harbor was considered valuable only for commerce and the islands as a convenient place to locate prisons or dumps. Over the years, however, other means of transportation have reduced the amount of commercial shipping entering the Harbor, along with the number of related shipping enterprises on the harbor's edge. This decline in commercial activity, as well as a renewed interest in environmental quality, has created the opportunity to revitalize the resources of Boston Harbor. Presently the Metropolitan Area Planning Council, under the direction of the DNR, is preparing an open-space and recreation plan for Boston Harbor and the Islands. Hopefully, the first phase of the plan — the acquisition of the Islands — will be implemented within the next two years.

Transportation and Rights-of-Way

One largely untapped but potentially important source of open-space recreational land can be found in the state and private transportation land holdings, particularly highway and railroad properties. Considerable amounts of recreational land and facilities can be opened up either by adapting multi-uses for highways and railroad rights-of-way, or by extending public transportation to areas now generally inaccessible for most people. In recent years several federal laws have been enacted to assist the states in this endeavor.

The National Environmental Policy Act of 1969 requires that an environmental impact study be prepared for any state, regional or local transportation project receiving federal funds. In Massachusetts this act has already had beneficial effects. It

has encouraged the state Department of Public Works to become more landscape-conscious in its road designs. Proper wetlands drainage along roads is now a vital consideration in highway construction. Most important, in terms of recreational-historic land, the act has served to prevent obliteration of a part of our heritage by highway construction and fostered instead, as one example, the restoration of a significant portion of the Middlesex Canal, America's first great transportation canal.

Other federal laws have served to encourage the philosophy that road designs should do more than make it possible for people to move quickly from one place to another. Road designs should also help make driving a recreational pleasure. The Federal Aid Highway Act of 1968 calls for environmental enhancement in areas through which improved transportation facilities pass. Such environmental enhancement in areas through which walks, benches and small parks. The act also requires that proposed highways be related to recreation plans, programs, and goals and requires the Secretary of Transportation to cooperate with the Secretary of the Interior in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of the lands traversed.

One of the most beneficial programs for Massachusetts under this act is the Highway Beautification Program. Administered by the Bureau of Public Roads, this program makes federal money available for removal of outdoor advertising signs, displacement or screening of junk yards, and construction of scenic overlooks and rest areas. Since 1966, Massachusetts' Department of Public Works has received more than $4.5 million for these programs.

One important way of providing more recreational opportunities is to make present areas more accessible. Good public transportation could provide the means for meeting some of the recreational demand, especially that for urban core areas. In the future, acquisition and development of parks and recreational facilities in and around urban areas and public transit links should be a major consideration. Presently the Metropolitan Boston Transit Authority (MBTA) provides either rapid transit or bus service to such metropolitan recreation areas as Revere Beach, Blue Hills Reservation and Beaver Brook Reservation. Also, in the future, not only additional rapid transit and bus lines but also railroads could be used to move urban dwellers to rural parks or natural areas. One such possibility would be train service from Boston to Cape Cod.

Ironically the demise of the railroad offers great recreational possibilities. The decline of the railroads has forced many companies to dispose of their former rights-of-way and excess land so since 1966 some 20 sections of railroad rights-of-way varying from a mile to more than 32 miles in length, have been abandoned in Massachusetts. Most of these lands consist of long narrow strips, about 80 feet wide, with occasional nodes which were formerly used for stations, switches or spurs.

With the renewed interest in hiking, biking and horseback riding and the increased use of off-road vehicles such as automobiles and trailbikes, additional trail lands are sorely needed. Abandoned railroad rights-of-way, because of level grades, good drainage and scenic locations, make ideal trails for meeting this need with little developmental cost. Although for the most part these rights-of-way are located in less dense or open areas, those located in population centers could also be used as greenbelts or linear parks.

Rights-of-way for highways, rapid transit and utility transmissions also comprise a significant amount of land in Massachusetts. Although acreage figures are not available, the linear mileage of rights-of-way (excluding railroads) totals nearly 6000 miles.

Utility rights-of-way have a great potential: for use as linkage between various recreational lands and open space; for connecting state, quasi-public and local lands; for incorporation into trail systems; and for providing natural cover for wildlife. Some rights-of-way are now being used for trail purposes, but they are generally scattered examples often on an informal basis, rather than part of an integrated land-use plan.

Transportation rights-of-way offer several possibilities that could provide for much more efficient land use, including the provision of access to lands effectively isolated by highways. In addition, multiple use of transportation rights-of-way for utility corridors offers the possibility of economical development. Abandoned rights-of-way, particularly railroad rights-of-way that have become a part of the surrounding landscape, would be better used for utility corridors, trail systems or other forms of open-space linkages rather than for commercial development.

The office of Transportation Planning of the Department of Public Works has made some investigations into the possibilities of transportation-utility corridors, but as yet this has not resulted in any policy or planning program. One of the major problems is that rights-of-way are owned by different agencies or groups and special conditions and requirements are involved. A state agency is needed to coordinate a multiple-use policy.

It is suggested that further study be made of multiple use of rights-of-way to establish policy and standards on a statewide basis. Such a study would aid in establishing more of an awareness and a better coordinated approach toward designing and utilizing rights-of-way at the state, regional and local level. Regional and local involvement is important to gain maximum benefit in meeting the needs of local areas.

In the future, reorganization of Massachusetts' government offers the opportunity to coordinate state transportation programs under a central agency, the Office of Transportation and Construction. Hopefully, the Office of Transportation, working with the newly established Office of Environmental Affairs, would then be able to develop a comprehensive program incorporating both the transportation and environmental needs of the state.

Canals

From the 17th to early 19th centuries waterpower turned the wheels of industry in North America. Essential to the operation were millpower and navigation canals. Fragments of these canal installations still exist and like the ruins of a Roman road or aqueduct, they have a story to tell about the past.

These remaining canals — both millpower and navigation — hold exceptional historical and recreational value. With the improvement of their water quality and public access, these canals could help satisfy important recreational needs for swimming, picnicking, scenic viewing, boating and fishing. Properly restored, canals could also offer unique forms of interpretive history — a journey into the past. But with urbanization threatening to obliterate the remaining traces, municipal and state agencies must act immediately and imaginatively if these forgotten and neglected canal resources are to be recaptured.

Town Commons

Since earliest times the town common has played an important part in the development of Massachusetts and New England. The often picturesque common, surrounded by a mixture of colonial and 19th century architecture, represents a plot of in-town open space which has been common or public land since the township's inception. The Massachusetts town common was the first attempt at conserving land for public use. It was a pioneer park, the use of which was strictly protected and governed by law. Livestock grazed on town commons and the local militia learned to resist tyranny on them. Town activities such as political debates, firemen's musters, concerts, celebrations and even local ball games were, and still are held on the common. A recent trend has been to utilize some commons for off-street parking or other conveniences which tend to detract and clutter the simple uplifting quality of an intown open space. Towns should be aware of their commons' heritage and careful not to damage this valuable open-space and historical resource.

Sanitary Landfill

Another source of potential open-space of recreation lands for Massachusetts is sanitary landfill areas. In the coming years the acreage of sanitary landfill areas should increase considerably as the State Legislature passed Chapter 834, Acts of 1969, establishing the Bureau of Solid Waste Disposal under the State Department of Public Works. The Bureau has the responsibility for planning programs and selecting sites for solid waste disposal. These programs and sites must be approved by the Departments of Public Health and Natural Resources. Sanitary engineers estimate that, although sanitary landfill areas may be used immediately for open-space and recreational areas (such as playgrounds), no building development should be undertaken on sanitary landfill areas for approximately 20 years after waste disposal has closed. The Department of Natural Resources already has the responsibility of reviewing the environmental effects of sanitary landfill areas. This responsibility could be widened to consider ways these lands could be developed for recreational use.

BICENTENNIAL CELEBRATION

The Bicentennial Celebration in 1976 will celebrate the nation's 200 years of independence. Because many of the events that led to the Declaration of Independence occurred in Massachusetts, the Commonwealth will play a major role in the Celebration.

It is anticipated that many millions of visitors will come to Massachusetts during the celebration years. This large influx of visitors will place tremendous pressure on housing facilities, transportation systems and recreation areas.

Many agencies and organizations are working on plans for the Bicentennial. All state agencies are to be coordinated with the Massachusetts Bicentennial Commission through the appropriate executive offices. The Commission has also established special "Committees of Correspondence" to co-ordinate with municipalities, special interest groups and organizations throughout the State.

Many projects have been initiated or are programmed for the near future, including:

1. Placing on the National Register of Historic Places important Revolutionary War sites not yet listed.
2. Establishing new parks and refurbishing of existing parks. Plans are underway to make a reality of Frederick Law Olmstead's open-space and park system envisioned 100 years ago.
3. Establishing historic trails including additions to existing trails such as the Freedom Trail in Boston.
4. Planning to accommodate the transportation needs generated by the heavy influx.

The coming Bicentennial years represent a great potential for Massachusetts, and particularly for the metropolitan area on which the celebration will focus. In general, the Bicentennial should be used to fill long term recreation and other needs rather than temporary projects aimed only at the celebration. Recommended steps include the following:

1. Through the administration of the Self-Help

and Land and Water Conservation Fund Programs and through the guidelines and priorities presented in this plan, the Massachusetts Department of Natural Resources should encourage communities to undertake projects that will relate permanent recreational improvements and acquisitions to the Bicentennial. For example, a more appropriate occasion hardly exists for a town to dedicate and renew its Town Common as public open space. At present many of these areas do not exist as such and are subject to the encroachments of parking lots and other urban developments.

2. Communities should work with the state's Historical Commission to identify and authenticate their historic homes and sites and seek federal funds for their restoration and registration.

3. Major, federal, state, regional and local planned open-space and recreation projects should be timed for the Bicentennial, with particular emphasis on meeting long term recreation needs of the area being served.

4. Adequacy of lodging and camping facilities for visitors should be studied.

A more detailed discussion of ways in which long term recreation and open-space needs can be met is included in the Eastern Massachusetts Region Supplemental Report published previously.

Public Involvement in Recreation Planning

State agencies have become aware of the need to involve citizens in the decision-making process of recreation planning. The Department of Natural Resources holds public informational hearings to explain state park proposals; and special town meetings, to explain plans for acquisition of lands, timetable and scope of development and anticipated impact of state parks on town(s). Procedures and legal authority are explained in detail and a statement of consent or disapproval is requested by the state from the citizens. It is possible for the citizens to work with the Department of Natural Resources to alter state plans or disapprove the entire project.

In addition to public informational hearings, citizens are involved through a Trails Advisory Committee and citizen advisory groups to state parks. Future plans call for reactivation of the state Outdoor Recreation Advisory Committee (mentioned under Continuing Planning.)

TRAILS ADVISORY COMMITTEE

In June of 1969 the Massachusetts Legislature passed an Act, Chapter 458 that amended Chapter 132 of G.L. by inserting Section 38A which provided that the Department of Natural Resources construct trails for horseback riding, hiking and snowmobiling. This new section required that an advisory committee be established in the following manner:

> "The Commissioner of Natural Resources shall appoint an advisory committee of fifteen persons which shall include representation from all areas of the commonwealth and representation from major trail-using organizations and which shall meet at least quarterly. The duties of said committee shall include advising said commission as to trail use and selection of advantageous areas for trail development, and coordinating the activities of interested private organizations."

A committee has been appointed and is carrying out its function of assisting in the development of trails and trail systems within the Commonwealth.

CITIZEN ADVISORY GROUPS TO STATE PARKS

At the present time, citizen advisory groups representing a recreational cross section of local communities, have been established for four state forest and park areas including Mount Wachusett State Reservation, Mount Greylock State Reservation, Otis State Forest and Wompatuck State Park.

The purposes of citizen advisory groups are to involve the local citizens of the surrounding communities in the Department's development of administrative and management policies, to provide for a group to which plans or changes concerning the state area may be presented and to provide for a local "sounding board" for airing problems and local concerns of the area. These groups are administratively established by DNR and have no authority except to advise the Department on forests and park lands. These groups vary in membership size; the make-up consists of one-half DNR appointments generally Department personnel. Additional advisory groups will be formed as local desires or needs become apparent.

Continuing Planning

Since any plan is a projection into the future, it is subject to changes that occur over time. If a comprehensive outdoor recreation plan is to be truly effective, it should be continually updated to reflect the changes that occur in the quantity and the kind of outdoor recreation lands and facilities needed. The up-dating procedure should include both reevaluation of objectives, policies and priorities, as well as consideration of shifts in governmental attitudes, responsibilities and fiscal capabilities. In addition, for an outdoor recreation plan to be implemented, it must encourage public participation. In the final analysis, only if people's desires and needs are incorporated into the plan will it gain the necessary public support to be effective. In Massachusetts the reactivation of a State Outdoor Recreation Advisory Committee should assist in giving the people a voice in the Plan.

The following general outline describes the continuing planning program which will give Massachusetts the capability for future long-range planning:

1. An update and refinement of the methodologies and findings of the 1971 plan.

2. A program which will render the present computer capabilities compatible with other State agency capabilities in order to provide base information for Land-Use Planning.

3. Establishment of institutionalized communication systems with the regional planning offices, other state agencies involved in recreation.

4. A system to monitor and participate in current studies which influence recreation. These studies include the Southeastern New England Study, the Transportation Studies, Coastal Studies, Department of Mental Health Land-Use Committee activities, planning for the 1975-76 Bicentennial, and the Charles River Plan implementation.

5. Initiation of new studies to further refine the analysis and information in this Plan. Specifically these studies should include:

a. A study of groups with special needs (elderly, handicapped, etc.), and recommended solutions.

b. Detailed study of the needs found in the camping analysis and solutions for meeting this great need.

c. A study to determine the specific needs for fishing, and hunting and other wildlife-oriented recreation in Massachusetts, and to develop special programs to meet these needs.

d. A study to develop the capability for continually measuring the attendance at state and other parks. Such a study would be used for measuring demand in specific areas of the Commonwealth.

e. A study for developing standards based on types of analysis used in 1971 Plan. These standards will enable better guidelines to be erected for providing recreation facilities, eliminating duplication of facilities and developing master plans.

APPENDIX

Appendix A

Outdoor Recreation and Open Space Inventory 1970

The 1970 Outdoor Recreation and Open Space Inventory identified 54 separate outdoor recreational activities grouped into 13 major categories:

pleasure driving	hunting
designated trails	shooting
swimming	camping
participant play areas	winter sports
picnicking	natural areas
fishing	passive recreation
boating	

For each activity the number of units available, such as picnic tables, campsites, tennis courts, was also given. In addition the questionnaire sought the following information:

1. During what periods of the year is the area open?
2. Is the area open to the general public? Fees?
3. Is the area accessible by automobile? Parking facilities provided?
4. Is the area accessible by public transportation?
5. What are the peak-use times for the area?
6. What draws people to the area or turns them away?
7. Does the area have facilities for the handicapped?
8. Does the area have programmed or potential expansion for acquisition and development?

Appendix B

Annual Activity Day Formulas

A. Swimming

Both pools and beaches were included in the inventory. In all areas of the state beaches provide much greater opportunity for swimming than pools because of Massachusetts' numerous inland lakes, ponds and ocean beaches.

In order to arrive at total annual activity days for swimming, a formula was derived which considered turnover rate, length of season, and maximum capacity as well as actual day-use capacity. Because pool units were calculated in square feet and beach units in linear feet, separate formulas were used to estimate pool and beach capacities.

As determined by weather patterns, the maximum number of seasonal days for swimming was found to be 100 days. These are concentrated primarily in June, July and August, but they also occupy some time in May and September.

The number of peak-use days for pools and beaches differs considerably. Massachusetts' experience indicates that beaches usually do not have more than three peak-use days per week because they primarily attract weekend visitors. Pools, on the other hand, have a much higher number of peak-use days, generally four or five days a week.

B. Picnicking

The formula used to convert the number of picnicking units (tables) into annual activity days includes the number of people per car, turnover rate and length of season.

The picnicking supply inventoried did not consider the extent to which people engage in picnicking in places where tables and other facilities are not present. This fact would tend to suggest that

Pool

Total No. of Square Feet / Square Feet Required per person (30)	X Turnover Rate (4)	X Number of Seasonal Days (100) and Peak-Use Days (56)	= Total Seasonal and Peak-Use Activity Days	X 90% = Annual Activity Days

Beaches

Total No. of Linear Feet / Linear Feet Required per person (2)	X Turnover Rate (3)	X Number of Seasonal Days (100) and Peak-Use Days (30)	= Total Seasonal and Peak-Use Activity Days (30)	X 90% = Annual Activity Days

Picnicking

Total No. of Tables	X Average No. People per Car (5)	X Turnover Rate (2)	X Number of Seasonal Days (100) and Peak-Use Days (30) =	Total Seasonal and Peak-Use Activity Days	X 70% = Annual Activity Days

the supply capacity information included here is probably well below the actual supply. Many open space areas are available for picnicking or other activity use even though they provide minimal facilities, perhaps just a few tables and trash cans. In fact, the lack of tables and the existence of an informal, unstructured atmosphere might attract a large number of picnickers who find this type of environment pleasing. Thus it is reasonable to conclude that the annual capacity indicated by the inventory data underestimates the actual available supply.

C. Camping

The formula derived to convert camping units (sites) into annual activity days includes the number of people per unit and seasonal days. Each night spent camping was considered a separate camping occasion even though many campers usually camp for two or more days at a time.

The number of seasonal camping days is officially 210: April 1 through October 31 in the state-owned forests and parks. Although this might not be a realistic season for all types of camping, much of the demand is taken up by trailer-campers and other types of enclosed vehicles so that in effect the camping season is not restricted by unfavorable weather conditions as readily as other outdoor activities.

D. Boating

The inventory included questions about marina access launching sites and boats-for-hire. Information on the capacity of both of these was converted into available parking spaces and then translated into annual capacity. The formula derived to estimate annual capacity included the number of units, turnover rate, number of people per car and seasonal days.

Camping

Total No. of Units	X Average No. of people per car (5)	X Number of Seasonal (210) and Peak-Use Days (63)	= Total Seasonal and Peak-Use Activity Days	X 70% = Annual Activity Days

Boating

Total Units of Parking Space	X Average No. of People Per Car (3)	X Turnover Rate (2.5)	X Number of Seasonal Days (210) and Peak Use Days (72)	= Total Seasonal and Peak-Use Activity Days	X 70% = Annual Activity Days

Appendix C

Other Federal Programs Affecting Recreation in Massachusetts

DEPARTMENT OF COMMERCE

Economic Development Administration carries out long-range economic development in areas of persistent unemployment and low-income families.

Programs	*Available To*	*General Description*
Public Works and Economic Development	State Local	Economic development and programming for areas with persistent unemployment or low family income. Outdoor recreation facilities for tourism development.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Community Resources Development Administration provides grants for water and sewer facilities under P.L. 89-117.

Programs	*Available To*	*General Description*
Water and Sewer Grants	Local	Provides grants up to 50% for developing new water and sewer facilities to improve living standards and provide orderly efficient growth of the area-wide community.

Program	*Available To*	*General Description*
Flood Insurance Administration provides subsidized flood insurance.	Private property owners	Provides federally subsidized flood insurance available to property owners in return for the adoption and enforcement of land-use and control measures in flood-prone areas by state and local governments to avoid future flood damage

INDEPENDENT FEDERAL AGENCIES

Office of Economic Opportunity - Programs designed to help eliminate poverty in the United States.

Programs	*Available To*	*General Description*
Vista	State Local	Volunteers help the poor find leadership from within their community.
Upward Bound	State Local	To motivate and prepare potentially capable low-income high school students for college. Provides cultural, recreational and physical activities.
Job Corps	State Local	Provides remedial education, training, recreation and guidance to disadvantaged young people (16-21) to increase their employability.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Administration of Aging assists state and local agencies through grants-in-aid in a variety of programs for the welfare of the elderly.

Programs	*Available To*	*General Description*
Aged Programs	State Local	Funds to support outdoor recreation programs for older people (Older Americans Act of 1965).

Office of Education offers grants to support primary, secondary, vocational, adult and higher education programs.

Programs	*Available To*	*General Description*
Elementary and Secondary Education Aid	State Local	Funds to further develop technical systems and provide consultation services to local education agencies and schools involved with various phases of education, including recreation.
Manpower and Development Training Act	State Local	To provide unemployed and underprivileged persons with skills and basic education to obtain better jobs.
Head Start	State	Preschool program providing educational activities and outdoor play areas.

National Institute of Mental Health provides grants and research programs to improve the methods and facilities for care of the mentally ill. It helps states and territories to develop plans for the expansion of mental health programs

Programs	*Available To*	*General Description*
Mental Health Training Grants	State Local	Grants to support training in use of recreational activities for therapeutic purposes. Also provides recreation for the elderly.

Rehabilitation Services provides vocational rehabilitation of the disabled.

Programs	*Available To*	*General Description*
Vocational Rehabilitation	State	To furnish recreational opportunities for handicapped persons.

Appendix D

Conservation Commissions

With the enactment in 1957 of Chapter 40, Section 8C of the General Laws Massachusetts became the initiator of a landmark conservation movement:

> A city or town...may establish a conservation commission...for the promotion and development of the natural resources and for the protection of the watershed resources of said city or town.

For the first time cities and towns that accepted the enabling legislation were given extended power to receive land for conservation and wildlife preservation purposes. The far-reaching significance of the Conservation Commission Act was felt at the community level where citizen response to environmental deterioration began to result in action programs. Citizen involvement with conservation planning has substantially contributed to the preservation and protection of the state's natural resources because conservation commissions help coordinate local, state and federal conservation efforts.

The Conservation Commission Act can be broadly interpreted to empower each city and town with the capacity for fulfilling its own needs. Since 1958 when the first conservation commission was established in Ipswich, the number of cities and towns which have committed themselves to the provisions of the Act has steadily increased. Suburban cities and towns in the Boston Metropolitan Area have provided the greatest thrust for the conservation movement through their recognition of and concern for preserving the limited supply of natural open-space land areas.

The Conservation Commission movement, although slow in its initial stages because of insufficient information about or awareness of conservation commission legislation, rapidly accelerated in the early 1960's. The number of conservation commissions increased from 19 in 1959 to 44 in 1960, and then more than doubled in 1961 with the establishment of an additional 52 conservation Commissions. By 1966 there were 235 commissions; between 1966 and 1971 sixty-one new commissions were added, bringing the current total to 296. This figure represents 84% of the Commonwealth's municipalities.

The rapid growth of conservation commissions is largely attributable to: 1) amendments to the original act that increased the powers of conservation commissions to include land taking by gift, purchase, easement or eminent domain, thereby providing additional incentives to towns and cities for the creation of conservation commissions; and 2) the state's initiation of a Self-Help Conservation Program in 1960.

Conservation commissions are comprised of three to seven appointed members whose terms are staggered from one to three years. The commissions ideally attempt to have a balanced representation of members, including businessmen, farmers, factory workers, educators, housewives, office workers, professionals and public relations personnel. Such a diversity of interests and backgrounds serves to maximize the effectiveness of commissions in all areas of influence.

The success of conservation commissions can be illustrated by projects undertaken as well as by numbers. In 1970, for example, projects which were successful in preserving valuable open-space land and in providing recreational activities for residents included: protection of watershed lands to provide public access for such activities as picnicking and fishing; protection of lowlands, including a pond for skating and hockey; acquisition of a salt-water cove for public boating and fishing, and purchase of a threatened man-made pond for water-based recreation.

The success of the Massachusetts conservation commission movement can be seen throughout New England as one by one the surrounding states have adopted similar legislation to join in what has become a national concern and awareness of man's natural environment. Rhode Island in 1960 was the first to follow Massachusetts in adopting conservation commission legislation, followed by Connecticut in 1961, New Hampshire in 1963, Maine in 1965, New York in 1967 and New Jersey in 1968. There is no doubt that the municipal citizen role in preserving natural resources has been strengthened and enhanced through this conservation movement.

Appendix E

Massachusetts Legislation Passed 1965-1971 Relative to Outdoor Recreation and Open Space

I. Environmental Protection	Chapter	General Description
Acts of 1971	732	Involves action for purpose of protecting natural resources and environment of Commonwealth; damage to environment defined.
Acts of 1969	627	Protects the Appalachian Trail.
	873	Classifies forest lands.
	618	Continues accelerated program of forest management for state forest lands.
Acts of 1968	79	Involves beautification of MDC reservations.
Acts of 1967	477	Establishes Committee to Keep America Beautiful.
	397	Provides for restoration, preservation and enhancement of scenic beauty and historic sites within or adjacent to federal-aid highways of the Commonwealth.
	786	Directs MDC to improve certain beaches in Met. Parks District and protect them against erosion.
Acts of 1966	470	Directs DPW that advance planning for highway construction shall provide for protection of water resources, fish and wildlife and recreational values.
	108	Provides for investment of conservation funds by cities and towns.
	179	Permits reimbursement of funds to city or town for conservation projects.

II. Fisheries and Wildlife	Chapter	General Description
Acts of 1967	802	Revises laws relating to inland fisheries and game and other natural resources.
	544	Authorizes Director of Fisheries and Game to designate certain persons to issue sporting, hunting, fishing or trapping licenses.
	262	Authorizes Director of Fisheries and Game to acquire certain lands for fish and wildlife purposes without consent of certain elected officers of city or town wherein such lands lie.
Acts of 1966	651	Provides for a special inland fisheries and game capital outlay program.
Acts of 1965	201	Makes corrective change in law relative to appropriations for stocking inland waters with fish and for liberating game.
	697	Relative to fees for certain permits and certificates issued by Division of Marine Fisheries.
	466	Provides that permits for commercial shooting preserves may be issued in all counties of the Commonwealth.
	801	Increases fees for sporting, hunting, fishing, and trapping licenses.
	117	Increases amount of money cities and towns may appropriate for stocking inland waters with fish and for liberating game.
	76	Further regulates fishing by means of bow and arrow.

III. Handicapped	Chapter	General Description
Acts of 1967	750	Directs MDC to construct a health, recreation, bathing pool and play area facility for handicapped children on land in Stony Brook Reservation in Hyde Park, district of Boston.

IV. Historic Landmarks		
Acts of 1971	359	Further regulates law establishing historic districts.

(con't)

	Chapter	General Description
	168	Provides for notice of urban renewal projects to be sent to Massachusetts Historical Society.
Acts of 1970	395	Establishes a Historic District Commission for Town of Nantucket Island and establishes Nantucket Island as the Historic District
Acts of 1966	704	Encourages preservation of historic buildings under urban renewal plans.
Acts of 1965	625	Establishes Freedom Trail Commission in the City of Boston.
	707	Involves procedure for certifying Historic Landmarks by Massachusetts Historical Commission.
V. Land Acquisitions		
Acts of 1971	633	Authorizes DPW to acquire land for public parks, recreation areas, wildlife preserves and historic sites to replace land required for use in federal highway programs.
Acts of 1966	457	Authorizes DNR to acquire certain lands and waters within Farmington River watershed.
	605	Authorizes DNR to acquire Kingsley's Sandy Beach, Lamb-
		Beach and Free Beach in Westfield for a state park.
VI. Recreational Facilities		
Acts of 1970	743	Provides for capital outlay program to Commonwealth for recreation and conservation purposes.
	86	Authorizes cities and towns to conduct recreational activities outside city or town limits.
	725	Provides for a recreation program for Metropolitan Parks District.
	709	Authorizes DNR to provide open-space recreation at Cook Pond in Fall River.
	742	Provides for acquisition of Islands in Boston Harbor by DNR for purposes of recreation and conservation.
	726	Provides for construction and administration of recreational facilities by DNR and DPW.
Acts of 1969	458	Provides for DNR's construction of trails for horseback riding, hiking and snowmobiling.
	906	Provides for construction and administration of recreational facilities by DNR and DPW.
Acts of 1968	607	Provides capital outlay program for Commonwealth for conservation and recreation purposes.
	85	Provides for extension of certain outdoor recreation facilities in cooperation with and with assistance from federal government; authorizes Commonwealth to borrow money in anticipation of receipt of federal funds.
	589	Provides for special recreation program for Metropolitan Parks District.
	565	Establishes Recreational Tramway Board in Department of Public Safety and provides for inspection and licensing.
Acts of 1967	707	Appropriates funds for extension of outdoor recreation facilities previously approved; authorizes Commonwealth to borrow money for said purposes.
Acts of 1966	611	Directs DNR to improve and expand recreational facilities in Lowell-Dracut State Forest.

(con't)

	Chapter	General Description
	648	Provides for special outdoor recreation capital outlay program for the Commonwealth.
	632	Provides for construction of certain recreational facilities by DPW in certain counties.
	650	Provides for a special recreation program for MDC District.
Acts of 1965	681	Authorizes and directs MDC to construct, enlarge and improve its recreational facilities.

VII. Water-Related (wetlands, floodplains, marine boundaries, pollution)

Acts of 1971	149	Increases panalties for certain violations of laws relative to protection of floodplains and inland wetlands.
	135	Prohibits discharge of refuse and other matter into or on inland or tidal waters.
	304	Prohibits burning of refuse, rubbish or demolition debris within certain marine or shoreline boundaries of the Commonwealth.
Acts of 1970	727	Provides special capital outlay program for shore protection and improvement to rivers and harbors, including Fall River Central Waterfront Project.
	747	Provides financial assistance to cities, towns and districts of Commonwealth for water pollution control districts.
	691	Involves payment of awards of damages and expenses incidental to protection of Coastal Wetlands in Massachusetts.
	704	Further regulates administration of Massachusetts Clean Water Act.
	810	Further defines ocean territory of Commonwealth.
	677	Directs Water Resources Commission to make certain flood control improvements for protection of Avon, Braintree, Holbrook, and Randolph; directs MDC to transfer certain land in Blue Hills Reservation to Braintree.
	878	Provides for continuous cleaning and dredging of harbors and inland waters to improve fishing and boating; establishes harbors and inland waters maintenance fund.
Acts of 1969	527	Increases amount of money which MDC may expend for construction of drainage and flood control facilities in Melrose, Malden, Everett, Revere, Saugus, Stoneham, and Wakefield.
	406	Requires municipal authorities to transmit their recommendations relative to the filing or dredging of coastal wetlands to certain persons and to the Director of Marine Fisheries and DPW.
Acts of 1968	608	Provides special capital outlay program for shore protection and improvement of rivers and harbors.
	444	Protects inland wetlands of Commonwealth.
	594	Authorizes DNR to provide public access to certain waters and related facilities to extend public access fund for certain purposes.
	597	Authorizes Commonwealth to borrow money to meet deficit in nonfederal cost of Three Rivers, Mass., Local Protection Project.
Acts of 1967	505	Authorizes Water Resources Commission to construct reservoirs for flood control and other

(con't)

	Chapter	General Description
		purposes in Bradley Brook watershed.
Acts of 1966	687	Provides for an accelerated water pollution control program.
	602	Authorizes Water Resources Commission to construct water retention area for flood control and other purposes in Diamond Brook watershed in Walpole.
	276	Extends time within which a public hearing shall be held under law relating to protection of floodplains.
Acts of 1965	220	Relates to protection of floodplains.
	768	Provides for protection of coastal wetlands of Commonwealth.
	375	Requires publication, in addition to written notices, of hearings relative to removal, filling and dredging of certain areas bordering on coastal waters of Comwealth.

Appendix F

Water Quality Standards

The Commonwealth of Massachusetts designates the following classes and uses to be protected in various interstate waters:

Fresh Waters

Class A - Waters designated for use as public water supplies in accordance with Chapter III of the Massachusetts General Laws; Character uniformly excellent.

Class B - Suitable for bathing and recreational purposes including water contact sports. Acceptable for public water supply with appropriate treatment. Suitable for agricultural and certain industrial cooling and process uses; excellent fish and wildlife habitat; excellent aesthetic value.

Class C - Suitable for recreational boating; habitat for wildlife and common food and game fishes indigenous to the region; certain industrial cooling and process uses; under some conditions acceptable for public water supply with appropriate treatment. Suitable for irrigation of crops used for consumption after cooking. Good aesthetic value.

Class D - Suitable for aesthetic enjoyment, power, navigation, and certain industrial cooling and process uses. Class D waters will be assigned only where a higher water use class cannot be attained after all appropriate waste treatment methods are utilized.

Coastal and Marine Waters

Class SA - Suitable for any high quality water use including bathing and water contact sports. Suitable for approved shellfish areas.

Class SB - Suitable for bathing and recreational purposes including water contact sports, industrial cooling, excellent fish habitat, good aesthetic value, and suitable for certain shellfisheries with depuration.

Class SC - Suitable for aesthetic enjoyment, for recreational boating, habitat for wildlife and common food and game fishes indigenous to the region, industrial cooling and process uses.

The general aim in designating uses for particular interstate waters is to recognize present uses and practicable future uses, to provide where possible for a variety of uses, and to assure compatibility of standards with federal, state and local resource planning. In order to satisfy the intent of the Federal Water Pollution Control Act to enhance water quality, the standards specifically provide that no interstate waters may be used solely or primarily for waste assimilation. All interstate waters must be aesthetically pleasing, and this quality is usually protected by narrative criteria preventing unsightly or obnoxious conditions, such as floating debris, oil slicks, unpleasant odors and colors.

Source: U.S. Environmental Protection Agency and Commonwealth of Massachusetts, Water Resources Commission, Division of Water Pollution Control *Water Quality Standards Summary*. December, 1971.

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